Specification of Charles Constant Joseph Guffroy : furnaces and other fire-places.

Contributors

Guffroy, Charles Constant Joseph.

Publication/Creation

London : Great Seal Patent Office, 1855 (London : George E. Eyre and William Spottiswoode)

Persistent URL

https://wellcomecollection.org/works/bfdg6j8k

License and attribution

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

A.D. 1855 . . . . . N° 1306.

SPECIFICATION

OF

CHARLES CONSTANT JOSEPH GUFFROY.

FURNACES AND OTHER FIRE-PLACES.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:
PUBLISHED AT THE GREAT SEAL PATENT OFFICE,
25, SOUTHAMPTON BUILDINGS, HOLBORN.
Price 1s. 8d.
1855.

A.D. 1855 . . . . . N° 1306.

Furnaces and other Fire-places.

LETTERS PATENT to Charles Constant Joseph Guffroy, Merchant, of Lille, Town in the French Empire, for the Invention of "AN IMPROVED SMOKE-CONSUMING APPARATUS."

Sealed the 16th November 1855, and dated the 7th June 1855.

PROVISIONAL SPECIFICATION left by the said Charles Constant Joseph Guffroy at the Office of the Commissioners of Patents, with his Petition, on the 7th June 1855.

I, CHARLES CONSTANT JOSEPH GUFFROY, Merchant, of Lille, Town in the French Empire, do hereby declare the nature of the said Invention for "AN IMPROVED SMOKE-CONSUMING APPARATUS" to be as follows:—

My Invention consists in the construction of a smoke-consuming apparatus, wherein, after the fuel has been once lighted, the fresh fuel is placed upon the incandescent mass, and the gaseous products from such fresh supply are caused to pass through this mass; jets of air are introduced through lateral apertures or pipes into the mass of incandescent fuel, in order to support combustion and make it as perfect as may be. I dispense with grate or fire bars, and provide an aperture at the tail or bottom of the apparatus, from whence to remove cinders, clinkers, &c., as may be required; a division or partition plate in the upper part of the apparatus prevents the smoke and gases as they are emitted

from the fresh fuel passing off into the heat flue without first traversing the incandescent mass.

As an exemplification, I proceed to shew by the following description and annexed Drawing, the manner in which my Invention may be carried into effect, and in my final Specification I shall shew the apparatus adapted to various boilers and furnaces for melting, heating, &c.

Figure 1 is a vertical section, and Figure 2 a horizontal section, on the line x, x, of Figure 1. The fuel is introduced at a, and soon commences to give off its gaseous products from contact with the incandescent fuel upon which it rests, the great mass of incandescent fuel, as at a^{1}, at which part numerous jets of air are introduced through nozzles c, c^{1}. a^{111} is the caloric or heat flue for conveying the heat where it may be required. The tail of the fire-place is at a^{11}, and through the door e cinders and clinkers are removed when necessary. d is a partition, which in the case of boilers may be a water space. This partition prevents the products from the fresh fuel passing away except through the red hot mass of fuel. The bottom part of the apparatus is shewn in three different forms at Figure 1, with and without a door. c^{11} are lateral air passages.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Charles Constant Joseph Guffroy in the Great Seal Patent Office on the 21st November 1855.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, CHARLES CONSTANT JOSEPH GUFFROY, Merchant, of Lille, Town in the French Empire, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Seventh day of June, in the year of our Lord One thousand eight hundred and fifty-five, in the eighteenth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Charles Constant Joseph Guffroy, Her special licence that I, the said Charles Constant Joseph Guffroy, my executors, administrators, and assigns, or such others as I, the said Charles Constant Joseph Guffroy, 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 "AN IMPROVED SMOKE-CONSUMING APPARATUS," upon the condition (amongst others) that I, the said Charles Constant Joseph Guffroy, 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 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 Charles Constant Joseph Guffroy, do hereby declare the nature of the 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 Drawings hereunto annexed, that is to say :—

My Invention consists in the construction of a smoke-consuming apparatus, in which, after the fuel has been once lighted, the fresh fuel is placed on the incandescent mass, and the gaseous products from such fresh supply are made to pass through the burning mass. The combustion is supported and assisted by jets of air introduced through apertures or nozzles, as herein-after explained. Grate or fire bars are dispensed with, and an aperture is provided in the "tail" or bottom of the apparatus, from whence cinders, clinkers, &ª, may be removed. A partition plate is added in the upper part of the apparatus to prevent the smoke and gases emitted from the fresh fuel passing off into the heat flue without first traversing the incandescent mass. This partition may in certain cases be provided with apertures for the admission of air to support combustion.

Figure 1 is a vertical section of a smoke-consuming apparatus constructed according to my Invention ; Figure 2, a horizontal section of the same through the line x, x, of Figure 1 ; and Figure 3, a front view.

a is the mouth of the apparatus through which the fuel is introduced; a^1, the part where the great mass of incandescent fuel rests; a^{111}, passage for the escape of products of combustion and incombustible gases; a^{11}, the "tail" or bottom of the apparatus, into which the cinders, clinkers, &ª, fall, and whence they may be removed through a door e when necessary; b, b^1, b^{11}, are the sides of the apparatus, in which are the apertures or nozzles c, c, c^1, c^1, through which jets of air penetrate into the burning mass. These apertures or nozzles are constructed in the peculiar manner shewn in section, Figure 2, and are arranged in pairs (on opposite sides of the apparatus). The sides of each nozzle-shaped aperture form alternately projecting and receding angles, as shewn in Figure 2. d is a partition, which forces the gases given off by the fuel to pass through the red-hot mass before escaping into the flue or passage

a^{111}; c^{11}, c^{11}, are narrow openings in the under part of the tail a^{11}, through which ashes fall, and a small quantity of air is admitted. Air is also allowed to enter at the further end of the "tail" to assist the combustion of the cinders which may fall there. The quantity of air admitted through the apertures or nozzles c, c, c^1, c^1, and the depth to which it is allowed to penetrate, are regulated according to the quantity of the gases given off by the burning fuel. e is a door for closing the tail a^{11}, which the stoker can lift up or open when he wishes to clear that part of the furnace; it may be made to open at three parts for greater convenience; e^1, e^1, are doors or registers for closing the mouth of the apparatus or part through which the fuel is fed in, and for regulating or shutting off any supply of air which it may occasionally be found desirable to admit through that part.

The apparatus is worked in the following manner:—Fuel having been introduced and lighted, fresh fuel is admitted through the mouth a, which, coming in contact with the incandescent or burning mass, commences to give off gaseous products, &c. The hydro-carburetted gases thus evolved, together with the oxide of carbon formed in the masses of fuel at the sides and below, and the currents of air penetrating through the apertures or nozzles c, c, c^1, c^1, pass through the mass of incandescent fuel at a^1, there become mixed and ignited. The products of combustion are then conducted where they are required through the hot air flue a^{111}, the cinders, &c. falling into the tail a^{11}. In this improved apparatus, the fuel burns slowly and regularly without giving off any black smoke. The cinders, &c. may be easily removed without stopping the furnace or interfering with the operation going forward, so that inferior descriptions of fuel may be used. The cinders do not clog the openings through which the air is admitted or penetrates; the air may, therefore, be introduced in regular quantities, and the number of openings need not be so considerable as in other furnaces. The air being more regularly distributed, a less amount is required, and the temperature may be kept at a higher point. The feeding in of the fuel and removal of the cinders are effected without admitting cold air into the burning mass. The apparatus, from its peculiar construction and arrangement, may be made of clay or other suitable material capable of checking the radiation of heat.

Figure 4 is a vertical section of my improved smoke-consuming apparatus applied as a domestic fire-place. a is the mouth through which the fuel is introduced; c, row of air holes or nozzles (shewn by dotted lines) in the side of the fire-place (there is here only one such row). a^{11}, the tail of the apparatus, opening behind; o, tube for conveying the products of combustion to the chimney; g, register for closing the mouth a when necessary. This register

may be made in three or more pieces, or so as to open in three or more places, in order to regulate the admission of air. *h*, sliding ash tray or receiver.

Figure 5 is a sectional view of my apparatus applied to a reverberatory furnace. *a*, mouth for feeding in the fuel; a^{1}, part to which the gases given off by the fuel are drawn; *c*, *c*, c^{1}, c^{1}, four or more rows of air holes or nozzles similar to those represented in Figure 2; *d*, partition; c^{111}, aperture in partition for admission of air; *g*, register, divided into compartments, or opening in two or three places for closing the mouth of the furnace wholly or partially; a^{11}, tail of the furnace, into which the cinders fall and where they are sifted. They may be removed therefrom from time to time. *h* is the ash-pit; a^{111}, passage for conveying the heated air, vapours, &c. into the parts *m* and *n*; *o*, chimney. The whole of this furnace except the doors *e* and *g* may be made of some material which is a non-conductor of heat. The arrangement represented in Figures 1 and 3 may be applied with advantage to tubular boilers; but as many engineers consider direct heating requisite for such boilers, I now proceed to specify a modification of the previous arrangement adapted for heating tubular boilers by direct heat.

Figure 6 is a vertical section of a tubular boiler with my improved apparatus applied thereto; Figure 7, a section through the line *x*, *x*, of Fig. 6, shewing the position of the top row of air holes; Fig. 8, transverse section through the lower row; Fig. 9, plan of the same; Fig. 10, plan of the longitudinal openings in the lower side of the tail. *a*, mouth of the apparatus; a^{11}, "tail"; a^{111}, passage for heated vapours; a^{1}, part where the incandescent mass of fuel rests; *b*, that part of the apparatus in which are the air holes or nozzles *c*, *c*, c^{1}, c^{1}, and which formed one of the sides of the apparatus shewn at Figure 1. The difference between this arrangement and that represented in Figure 1 consists in the extended length and inclination given to the part *b* (containing the air holes), whereby the heat from the burning mass of fuel is made to radiate, and thus give off direct heat, and also in the inclination of the partition *d*. This partition is provided with two rows of horizontal air holes or nozzles c^{111}, c^{111}, from which currents of air are allowed to penetrate to the layers of fuel at different depths for the purpose of assisting combustion. The partition is made in three pieces, mounted in an iron frame g^{1} (Figures 6 and 7), but in such manner as to move freely thereon; the edges of the frame lap over, so as to hold the pieces in the frame.

The partition may be made of any suitable substance which is a non-conductor of heat. b^{1} is a part of the "tail" in which there are no air holes; c^{11}, c^{11}, are openings near the bottom of the "tail" for the passage and sifting of

the cinders; s, s^1, are blocks or beds for supporting the ends of the part b. The block s^1 which is at the lower end is in a piece with the upper side of the "tail." The part b is made in five pieces (Figures 8 and 9), one part of each being flat, as at a, so that when fitted together they form, as it were, a bed or table extending the whole breadth of the furnace on which the fuel rests. The shape given to the air passages c, c, c^1, c^1, is clearly shewn in the plan and section (Figures 8 and 9.) i, i, are wedges or partitions inserted so as to divide the air entering through c^1, c^1, into numerous streams. The sides of the passages c, c, are kept apart by pins or stays, one at each end and one in the centre. t is a bar or rest for the stoking tools; f, door in the "tail"; k, seat for the stoker; v, screen to be used when the apparatus is employed in locomotive engines for directing the air into the air holes c, c, c^1, c^1, when the locomotive is in motion; z, hinge for lowering the tail when it is desired to empty it. The jolting of a locomotive is generally sufficient to work the fuel gradually down as it burns, but in fixed engines the stoker may from time to time work the fuel down by means of a flat-ended iron rod, introduced through the bottom of the triangular spaces formed by the air holes c, c, c^1, c^1. The state of the fuel may be inspected from time to time through the apertures c^{111}, c^{111}, as also the color of the flame (especially at the part a^1). If the flame is blueish, it would indicate the presence of oxide of carbon, and an insufficient supply of air, in which case the stoker should thin the layer of fuel over the holes c^1, c^1, or he may slightly raise up the mass of fresh fuel at a, so as to admit more air. If the flame is yellowish, it would indicate that there was too much air, in which case the fuel at the mouth of the furnace must be heaped up to shut the air off; and if this should not be sufficient, the top hole c^{111} might first be plugged up, and then the lower of these holes, if necessary.

Figure 11 is a vertical section of a stationary boiler with my apparatus applied thereto. The arrangement of the furnace is similar to the foregoing, except that the fire bridge p is hung from the top. The heated products of combustion, instead of passing over the fire bridge and between it and the boiler, are driven under the fire bridge, and nearer the layer of fuel on the bottom of the furnace. Figure 12 is a transverse section of the same.

And having now described the nature of the said Invention, and in what manner the same is to be performed, I declare that I claim as of my said Invention,—

First, the peculiar construction of smoke-consuming apparatus, in which fresh fuel is received upon an incandescent mass after the fire has been lighted, and in which the products given off from such fresh fuel are caused to pass through the incandescent mass, as herein-before described.

A.D. 1855. JUNE. 7. N°. 1306. *(1 SHEET.)*

GUFFROY'S PROVISIONAL SPECIFICATION.

FIG. 1.

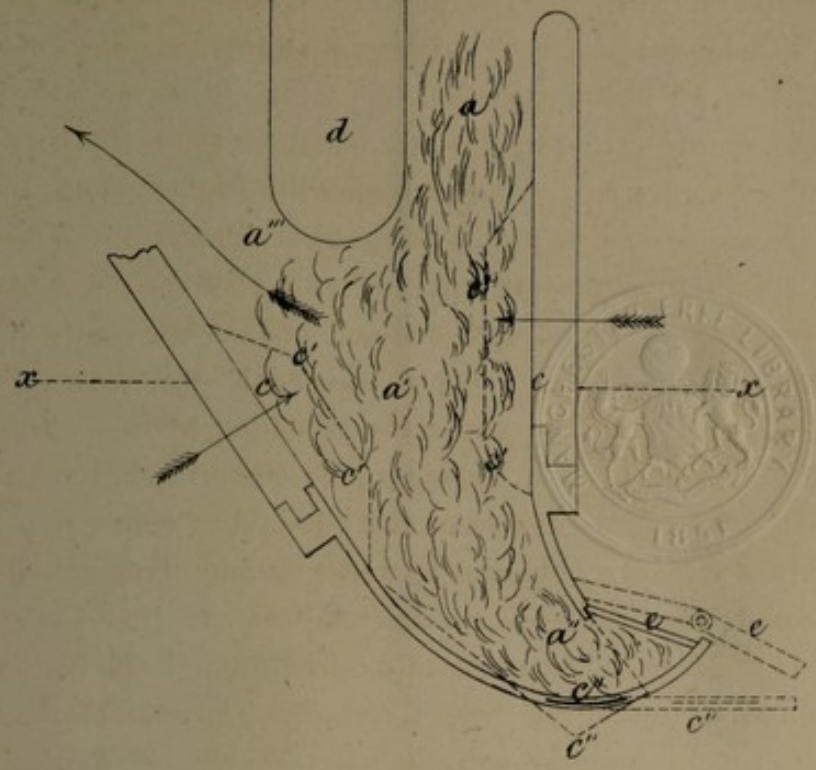
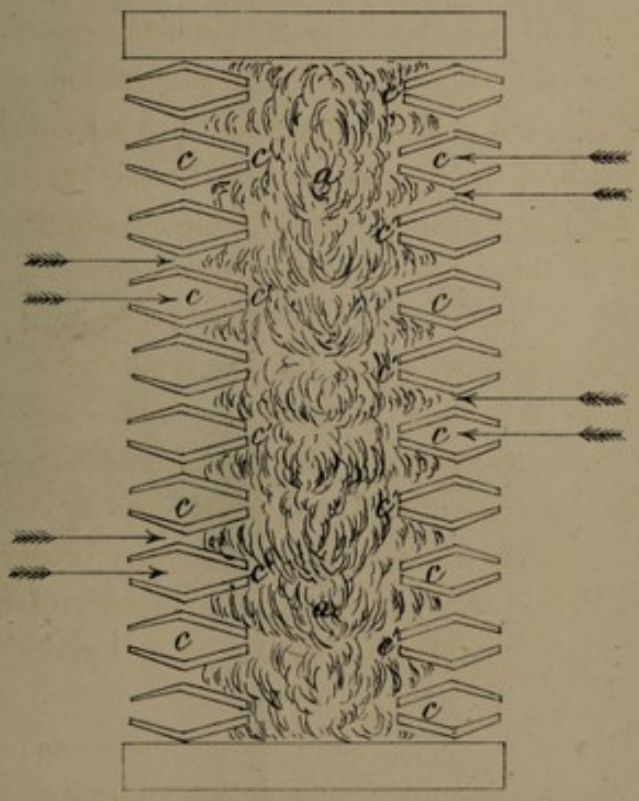
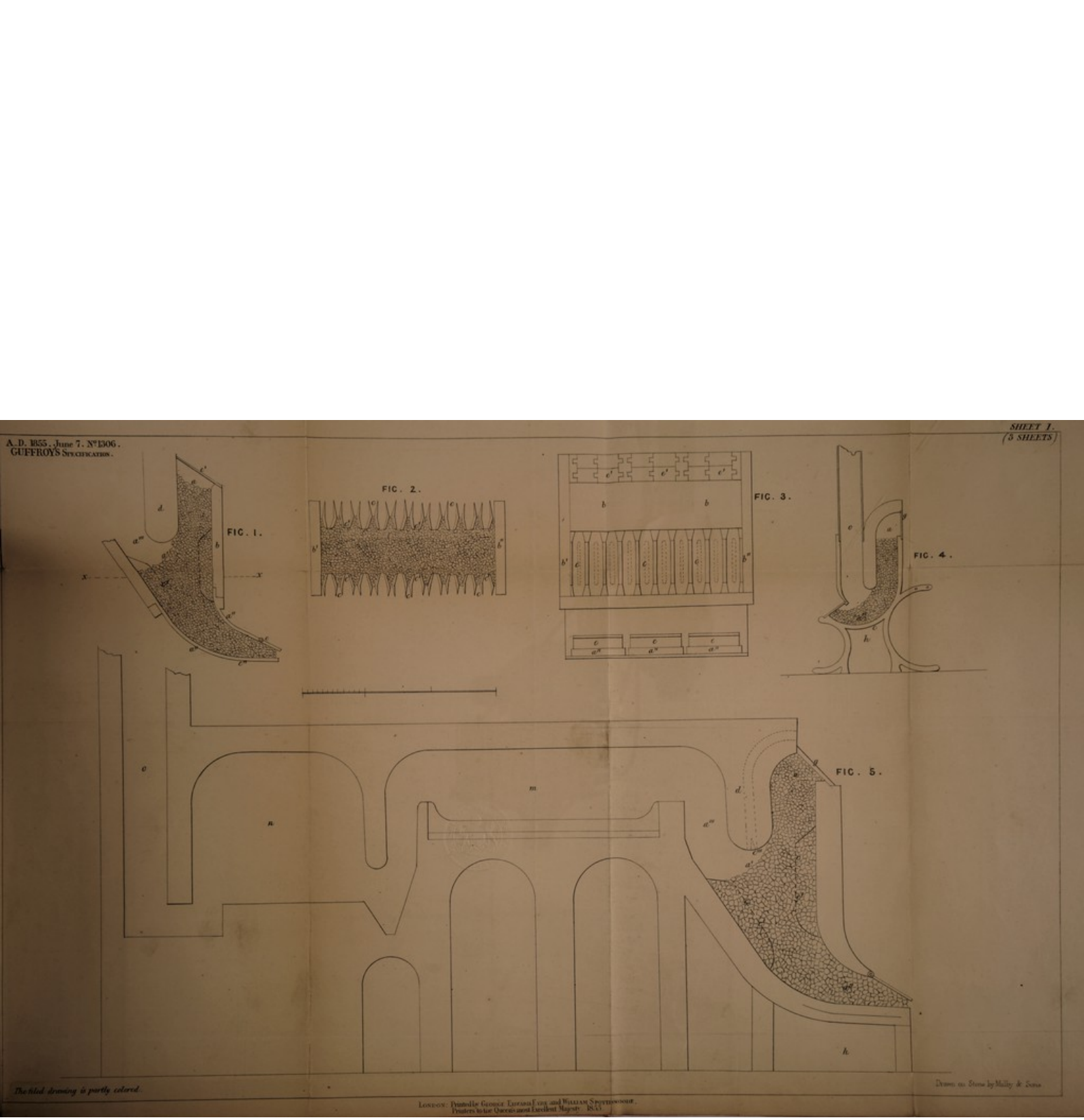


FIG. 2.



The drawing left with Provisional Specification is partly colored. Drawn on Stone by Malby & Sons.

LONDON: Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1855.



The tiled drawing is partly colored.

Drawn on Stone by Malby & Sons

LONDON: Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1855.

FIG. 6.

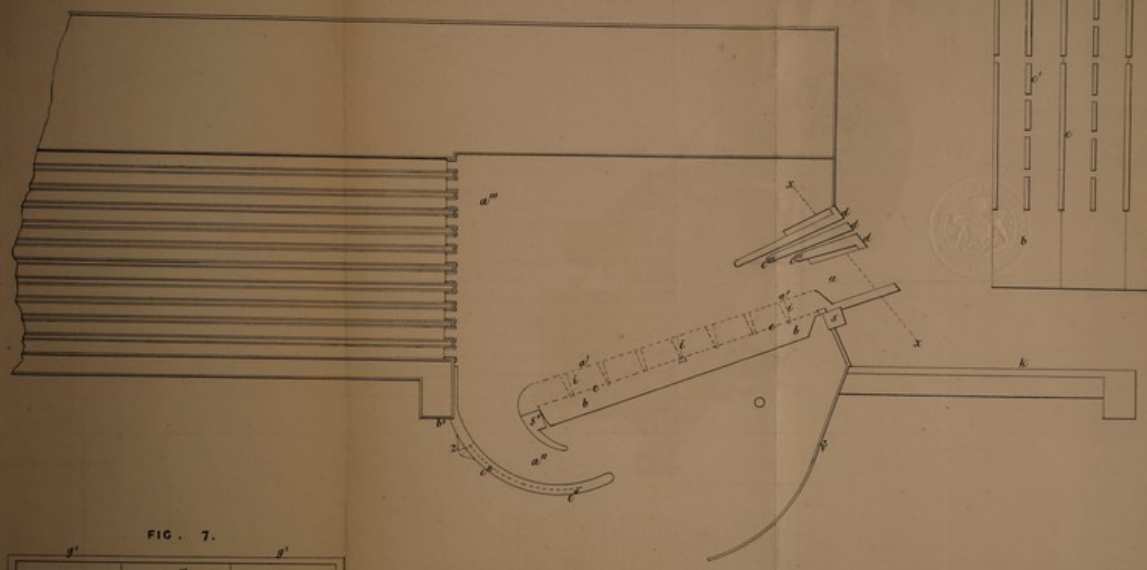


FIG. 9.

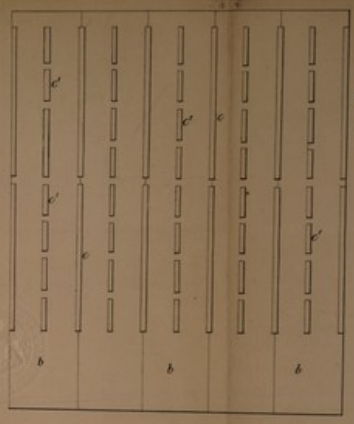


FIG. 7.

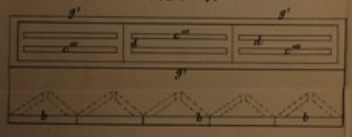


FIG. 10.

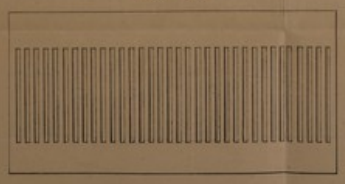


FIG. 8.

The filed drawing is partly colored.

Drawn on Stone by Malby & Sons.

London: Printed by George Edward Eyre and William Spottiswoode,
Printers to the Queen's most Excellent Majesty. 1855.

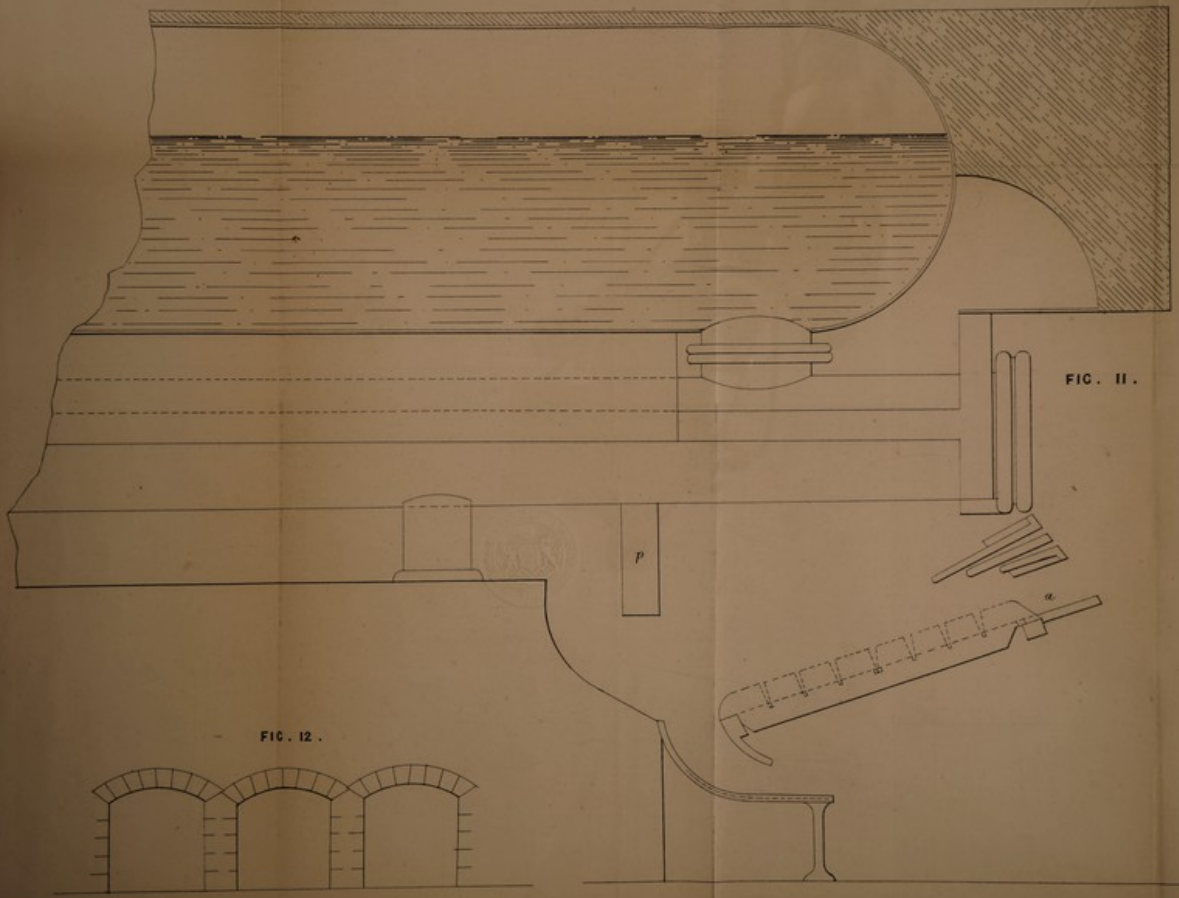


FIG. 11.

FIG. 12.

The filed drawing is partly colored.

Drawn on Stone by Malby & Sons.

London: Printed by George Edward Eyre and William Spottiswoode,
Printers to the Queen's most Excellent Majesty. 1855.

Second, the admitting of air into fire-places or furnaces through apertures or nozzles constructed and placed as herein-before described.

Third, the general arrangement and construction of smoke-consuming apparatus shewn at Figures 1, 2, 3, 4, and 5, and at Figures 6 and 11.

In witness whereof, I, the said Charles Constant Joseph Guffroy, have hereunto set my hand and seal, this Tenth day of November, in the year of our Lord One thousand eight hundred and fifty-five.

C. C. J. GUFFROY. (L.S.)

Witness,

CH. ARMENGAUD, Ingr Civil,
6, Rue Filles du Calvaire, à Paris.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1855.