Specification of William Clark : producing draught and purifying smoke in furnaces.

Contributors

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A.D. 1866, 21st DECEMBER. N° 3371.

SPECIFICATION

OF

WILLIAM CLARK.

PRODUCING DRAUGHT AND PURIFYING SMOKE IN FURNACES.

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A.D. 1866, 21st *December.* N° 3371.

Producing Draught and Purifying Smoke in Furnaces.

LETTERS PATENT to William Clark, of 53, Chancery Lane, in the County of Middlesex, Engineer and Patent Agent, for the Invention of "Improvements in Apparatus for Producing a Draught in Furnaces, and for Purifying the Smoke therefrom."—A communication from abroad by Claude Moret, Mechanical Engineer, and Félix Raux, Gentleman, both of 29, Boulevart St. Martin, Paris.

Sealed the 11th June 1867, and dated the 21st December 1866.

COMPLETE SPECIFICATION filed by the said William Clark at the Office of the Commissioners of Patents, with his Petition and Declaration, on the 21st December 1866, pursuant to the 9th Section of the Patent Law Amendment Act, 1852.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, William Clark, of 53, Chancery Lane, in the County of Middlesex, Engineer and Patent Agent, send greeting.

WHEREAS I am in possession of an Invention for "Improvements in Apparatus for Producing a Draught in Furnaces, and for Purifying the Smoke therefrom," and have petitioned Her Majesty to grant unto me, my executors, administrators, and assigns, Her Royal Letters Patent for the same, and have made solemn Declaration that it has been communicated to

me from abroad by Claude Moret, Mechanical Engineer, and Félix Raux, Gentleman, both of 29, Boulevart St. Martin, Paris.

NOW KNOW YE, that I, the said William Clark, do hereby declare that the following Complete Specification under my hand and seal fully describes and ascertains the nature of the said Invention, and in what manner the same is to be performed in and by the following statement, reference being had to the Sheet of Drawings hereunto annexed, and to the letters and figures marked thereon (that is to say):—

Many attempts have been made to prevent the dispersion into the atmosphere of the black smoke produced by the combustion of fuel in furnaces, and various combinations of apparatus have been tried and proposed without, however, answering the purpose entirely, and even if partially successful in some cases it has been at the expense of the fuel, at the same time increasing the liability to accident.

This Invention relates to apparatus for attaining the desired result in a perfect economical and available manner. This apparatus intercepts the smoke which would otherwise pass into the atmosphere in a highly heated state as near as possible to its point of production and transforms it into a white vapor, which condenses in the air without disengaging any black particles.

The apparatus consists, 1st, of a reservoir formed of metal, masonry, or otherwise, of an extent in proportion to the amount of smoke to be intercepted, and divided into two compartments for the inlet and outlet of the smoke.

2ndly. Of cylinders provided with water joints of a circular or other form, each provided with two valves, one for the suction and the other for the discharge; these cylinders are worked alternately by means of a beam or other means of transmission driven by a steam engine or hand power.

3rdly. Of a metal or other receiver containing small coke or other separating matters supported on a grating, into which matters water is injected from above. The smoke after passing through about 8 inches of water under the grating traverses the coke or other matters containing water as above mentioned, where it becomes separated from the unconsumed parts, and is discharged into the atmosphere from the receiver in the form of a white vapor, like steam, at a greater or less height, or it may be condensed by refrigeration, in order to extract any remaining products of combustion, or used for any heating purpose. By reason of the exhausting action of the cylinders mounted on the reservoir which is in communication with the furnace flues, the products of combustion are withdrawn, and a vacuum being created, more or less partial, a quantity of air passes down through the grating for

maintaining and increasing the combustion, in fact, the exhausting action causes the smoke to pass to and fro above the fire, creating long flames whereby a portion of the smoke is consumed.

This Invention is illustrated in the accompanying Drawings, Figure 1 of which shows a central vertical section of the apparatus on the line 1, 2; Figure 2, which is a horizontal section of the same on the line 3, 4, Figure 1; Figure 3 is a vertical section of the apparatus on the line 5, 6, Figure 2; Figure 4 is a central vertical section of the purifying apparatus taken through the line 7, 8, Figure 5, which last is a horizontal view of the same. The same letters of reference serve for all the Figures.

a, reservoir of a size in proportion to the amount of smoke to be treated; *b*, *c*, two cylinders fixed in a vertical position on the cover of the reservoir *a*, having between them an annular space which is filled with water to make hydraulic joints for the two movable bells or inverted vessels *d* of the cylinders, which are received in the annular spaces and serve for extracting and discharging the smoke; *e*, hinged joints with which are connected the mechanical parts serving to produce the rising and falling motion of the bell covers *d*, such as by a beam for example, while one cylinder is taking in the other is discharging, and vice versa, so that the smoke is being continually drawn from the furnace; *f*, manhole or opening for giving access to the suction valves; *g*, point of communication between the reservoir *a* and the smoke flues; *h*, point at which the smoke passes to the purifier; *i*, *i*, pipes for conveying water to the annular spaces in which the bells *d*, *d*, work; *j*, *j*, discharge pipes for the water contained in the annular spaces; *k*, *k*, openings for regulating the discharge valves; *l*, suction valve; *m*, discharge valve. By means of these valves *l*, *m*, communication is effected between reservoir *a* and cylinders *d*, *d*; *n*, opening for removing any scoria or cinders which may be contained in the water introduced into the discharge chamber through the openings *k*, *k*; *o*, *o*, division plate separating the reservoir *a* into two parts or chambers; the one termed the suction chamber is provided with a suction or inlet valve *l*, the other and discharge chamber having a discharge valve *m*; *p*, grating of the purifying apparatus for supporting the coke or other matters for separating the constituent parts of the smoke or absorbing a portion thereof; *q*, bottom of the purifier below the grating *p*; *r*, opening for removing the scoria from the bottom of the purifier; *s*, pipe for the passage of the smoke into the purifier; *t*, overflow pipe for the water through which the smoke passes; *u*, opening affording access for cleaning the grating *p*, *p*; *v*, matters for purifying the smoke by separation to facilitate its washing with water, and if necessary absorbing it in part; *w*, tube or plate provided with small perforations for

projecting water on to the purifying matters *v*; *x*, discharge orifice, from which the smoke passes, either to a condenser into the atmosphere or to any point to be heated; *y*, cover of the purifier bolted or otherwise fixed to the body *z*. The whole being arranged as described and represented in the Drawings, the cylinders *d* are set in motion so as to exhaust the products of combustion from the furnace; the gases therefrom enter the suction chamber by the pipe *g* and passing through the valve *l*, are discharged at *m* into the discharge chamber, passing thence by the pipe *h* to the mouth *s* of the purifier, where they are washed in passing through the coke by the water which falls in the form of rain from the perforated pipe *w*; the smoke thus washed, or it may be partially absorbed in the purifier, escapes at orifice *x* into the atmosphere, or to be utilized or condensed.

Having described the nature of this Invention, and the manner of performing the same, I declare that what I claim as the Invention to be protected by the herein-before in part recited Letters Patent is,—

1st. The application of the apparatus herein-before described (as a substitute for the tall chimneys and shafts now employed) for regulating the draught and purifying the smoke of furnaces.

2ndly. I claim feeding furnaces with air by a more or less powerful draught, either continuous or intermittent, produced by means of the apparatus described.

3rdly. I claim transforming the smoke by the aid of the apparatus described into a white vapor, and separating the black particles and other products contained, which in this state may be used for heating the feed water, the latter being rendered less liable to produce incrustation, or it may be applied to other heating purposes.

It must be understood that the arrangement of the apparatus may be greatly varied according to the peculiar nature of each application, and that it is applicable to the boiler furnace of stationary, locomotive, or marine engines.

In witness whereof, I, the said William Clark, have hereunto set my hand and seal, this Twenty-first day of December, in the year of our Lord One thousand eight hundred and sixty-six.

W. CLARK. (L.S.)

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CLARK'S Complete Specification.

(1 SHEET)

FIG. 1.

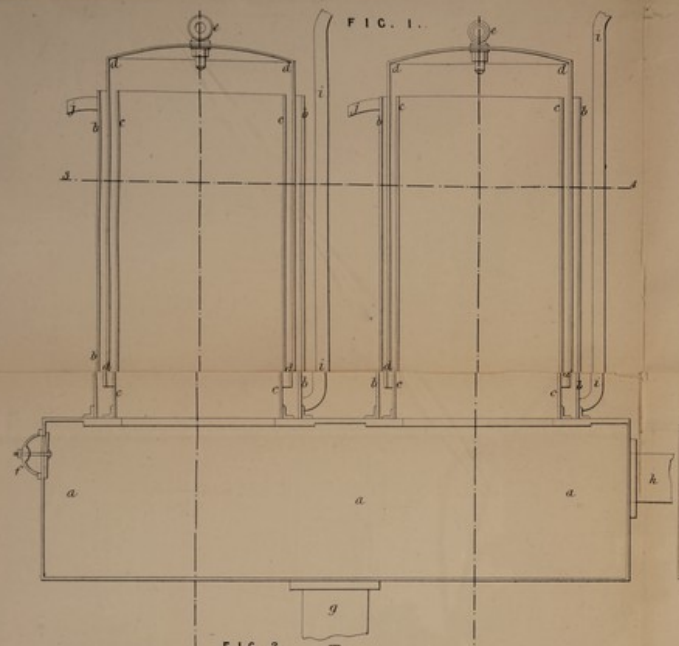


FIG. 3.

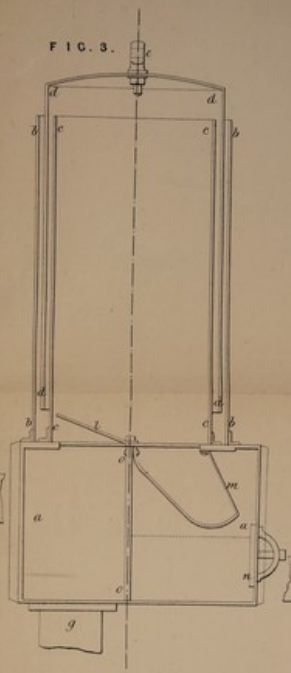


FIG. 4.

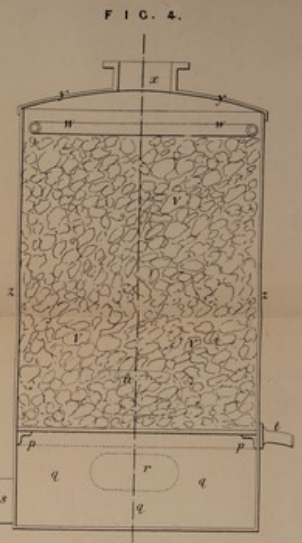


FIG. 2.

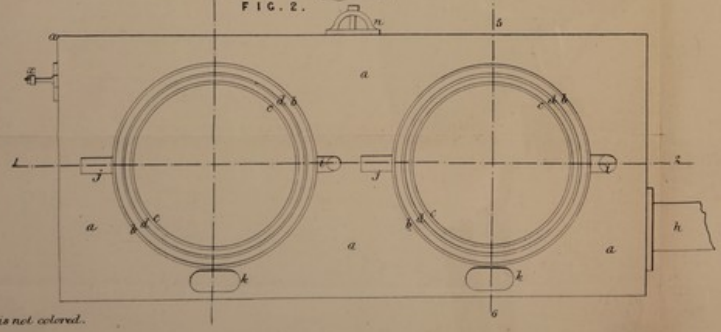
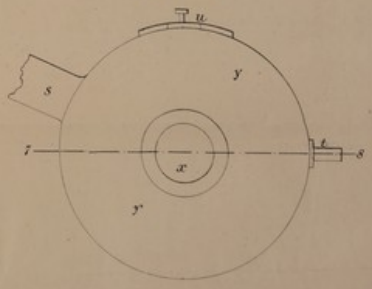


FIG. 5.



The filed drawing is not colored.

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