



A.D. 1848 N° 12,329.

Coke Ovens.

WILKINSON'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM WILKINSON, of Jarrow, near Gateshead, in the County of Durham, Coke Manufacturer, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her
5 Royal Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Sixteenth day of November, in the twelfth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said William Wilkinson, Her especial license, full power, sole privilege, and authority, that I, the said William Wilkinson, my exors, admors, and assigns,
10 and such others as I, the said William Wilkinson, my exors, admors, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein mentioned, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, and in all Her Majesty's Colonies and Plantations
15 abroad, and in the Islands of Jersey, Guernsey, Alderney, Sark, and Man, my Invention of "CERTAIN IMPROVEMENTS IN THE CONSTRUCTION OF COKE OVENS, AND IN THE MACHINERY OR APPARATUS TO BE CONNECTED THEREWITH;" in which said Letters Patent is contained a proviso, obliging me, the said William Wilkinson, by an instrument in writing under my hand and seal, particularly to
20 describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, and to cause the same to be enrolled in Her Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

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NOW KNOW YE, that in compliance with the said proviso, I, the said William Wilkinson, do hereby declare that the nature of my said Invention, and the manner in which the same is to be performed, is particularly described and ascertained in and by the following description thereof, reference being had to the Drawings hereunto annexed, and to the letters and figures marked 5 thereon (that is to say):—

My Invention consists, firstly, in improvements in the construction of coke ovens, whereby I am enabled to distribute the supply of air necessary for the proper charring of the coal in a more equable manner than heretofore, over and through the incandescent mass, and thus increase the yield obtained from 10 a given quantity of coal, and improve the quality of the coke produced.

My Invention consists, secondly, in the application of machinery to the working of coke ovens, by which means I am enabled to curtail the expenditure of manual labor in carrying on the operation.

My Invention consists, thirdly, in the means of applying the heat dissipated 15 during the carbonization of the coal to the evaporation of saline solutions.

And in order that my Invention may be fully understood, I will proceed to describe the means of carrying the same into effect.

In the accompanying Drawing, Fig. 1 represents in back elevation two of a series or range of my improved coke ovens, one of the ovens being partly 20 in section, the better to shew the construction thereof. I will first describe my improved application of machinery to the working of coke ovens as it may be used in connection with the coke ovens of other constructions than that made according to my Invention.

A is a shaft running parallel to the range of the said ovens, and extending 25 from one end to the other of the series; B, B, are the bearings, by which the shaft A is supported; C, C, are pinions mounted upon the shaft A, and capable of sliding thereon when required. These pinions gear respectively into rack teeth on the rods D, which rods are sustained in a horizontal position by the guide frames and rollers E, e, and severally carry at their inner ends an oblong 30 cast-iron plate F. These plates being placed in a line with each other extend nearly across the oven, as shewn at Figs. 1, 2, and 3, Fig. 2 being a front view of the ovens, and Fig. 3 a plan view of the same, the right-hand oven being in section. Openings G (Figs. 3 and 4) are made in the masonry to allow of the rack rods D entering the oven. The plates F are attached to 35 their rods from the interior of the oven, and are made to traverse from one end of the oven to the other by the pinion C (in gear with the teeth of the rack rod D), being caused to rotate by a steam engine or other suitable power. The object of this arrangement is to discharge the coke from the oven (when

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the operation of charring is completed) in a more expeditious way than heretofore, the plates F by the motive power communicated to them being gradually forced forward towards the front of the oven, and driving before them the coke on the floor of the oven, whereby the ordinary manual operation
5 of withdrawing the coke is dispensed with.

From the foregoing arrangements it will readily be understood that when the shaft A is made to revolve by any suitable power, the pinions C, C, will at once communicate a rectilinear motion through the rack rods D to the plates F, F, which being forced forward will drive the coke out of the oven
10 at the front opening H (Fig. 2). As, however, it will never be required to discharge all the ovens simultaneously, I mount the pinions C so that they may be slidden on their shaft, and by a common lever movement be disengaged from or brought into gear with the teeth of their respective rack rods D, as desired.

15 My improvements in the construction of coke ovens consist in arranging a set of flues, by means of which the air, introduced into the ovens to support combustion during the carbonization of the coal, may be divided and diffused over the surface of the ignited coke, and at the same time regulated in quantity to suit the quality of coke required to be manufactured.

20 It is well known that a considerable loss is sustained in the ordinary way of manufacturing coke by admitting the whole of the air necessary to keep up combustion at the doorway or front of the oven, for a current of air is thereby caused to pass over the front of the ignited coke, and by the said current a large portion of carbon is oxidized, and carried off in the form of
25 carbonic acid gas, and consequently lost to the manufacturer; but by my improved mode of diffusing the air uniformly over the ignited coke, I am enabled to effect a considerable saving of the material under operation.

At Fig. 2 which represents a front elevation of two of my improved ovens, I is the bottom or floor one foot above the level of the ground; J is the door-
30 way extending across the full width of the oven. It is closed by a door let down in front thereof by the means shewn in the Drawing, or in any other convenient way. K, K, are air flues running parallel with the arch of the oven, as shewn in the sectional plan, Fig. 3, and communicating with the interior of the oven by a series of lateral openings L, L, L, Figures 3 and 4,
35 through which the air in the flues K is admitted to the ignited coke. These flues near the back of the oven are connected together by a cross flue K* (shewn by dots in Fig. 3), which is also provided with lateral openings for distributing the air over the coke.

The size of the oven I prefer using is fourteen feet long by eight feet wide,

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the floor being one foot above the level of the ground, with an inclination to the front of six inches in the length of the bottom, and the perpendicular height of the side walls up to the springer being three feet while the radius of the arch is four feet.

I would here remark that flues, similar to those just described, may with 5 advantage be used in conjunction with the ordinary forms of coke ovens, for the purpose of distributing the air equally over the ignited mass.

I will now describe the last part of my Invention, which refers, as before stated, to the economic application of the heat given off during the operation of manufacturing coke. 10

Fig. 5 represents in plan view a range of twelve coke ovens, with an evaporating and crystallizing pan (which I use for the manufacture of common salt) applied thereto, and Fig. 6 is an elevation of the same range. A, A, are the flues leading from the ovens B, B, and connected with the flue C (shewn by dots in Fig. 5), which runs underneath the evaporating 15 pan D; E, E, are two auxiliary furnaces, which I use for the purpose of keeping up the temperature of the flue C, and burning the combustible gases which are given off from the coke ovens; F is a crystallizing pan, and G, a receptacle or well into which the salt is collected; H, H, H, H, are furnaces attached to the crystallizing pan, and intended to regulate the concentration 20 of the liquor, as circumstances may require. Fig. 7 represents in end elevation the range of ovens and pans shewn at Figures 5 and 6; and Fig. 8 is a longitudinal section of one of these ovens.

The mode of operation pursued by me in the manufacture of chloride of sodium is as follows:—The evaporating pan D, I keep supplied with salt 25 water from a reservoir or other convenient source, and in order to apply the heat equally to the pan D, I charge each alternate oven at proper intervals of time, dividing the range into three sections of four ovens each, and charging one section per day. By this means the combustible gases liberated from each newly charged oven are brought into contact with the heated flue of the 30 next oven, which is in a more advanced stage of the process, and by introducing a proper quantity of air to support combustion in the circulating flue, the whole of the combustible gases, or nearly so, are ignited; Q, Q, are apertures by which I introduce air to support combustion at any point I find necessary in the circulating flue. Each of the ovens I provide with a 35 damper R, by which I intercept the communication with the circulating flue C at pleasure. The two auxiliary furnaces E, E, I use for the purpose of keeping up the temperature of the circulating flue, and at the same time to give me control over the evaporating pan.

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When I find the liquor or brine sufficiently concentrated in the evaporating pan, I discharge a portion of it into the crystallizing pan by means of the connecting pipe S, Figures 5 and 7, and by well-known means I purify the liquor, before precipitating or crystallizing the salt, by a further concentration of the said liquor by means of the furnaces H, H.

Having now described my Invention, and the manner of carrying the same into effect, I wish it to be understood, that under the above in part recited Letters Patent, I claim, as of my improvements in the construction of coke ovens, the forming in the walls thereof flues with lateral openings, for the purpose of supplying air to the interior of the oven, and equally diffusing it over the surface of the ignited mass, as above described.

And with respect to the machinery and apparatus connected with coke ovens, I claim the mechanical means above described and shewn in the Drawing, or any analogous arrangement, for discharging the coke from the ovens.

And, further, I claim the mode, herein-before described, of economizing the heat given off from coke ovens during the manufacture of coke, and applying it to the evaporation of saline solutions.

In witness whereof, I, the said William Wilkinson, have hereunto set my hand and seal, this Fifteenth day of May, in the year of our Lord One thousand eight hundred and forty-nine.

WILLIAM (L.S.) WILKINSON.

AND BE IT REMEMBERED, that on the Fifteenth day of May, in the year of our Lord 1849, the aforesaid William Wilkinson came before our said Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

Enrolled the Sixteenth day of May, in the year of our Lord One thousand eight hundred and forty-nine.

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