G. LAMBERT.

COKE OVEN.

No. 12,209. Patented Jan. 9, 1855.

Fig. 1.

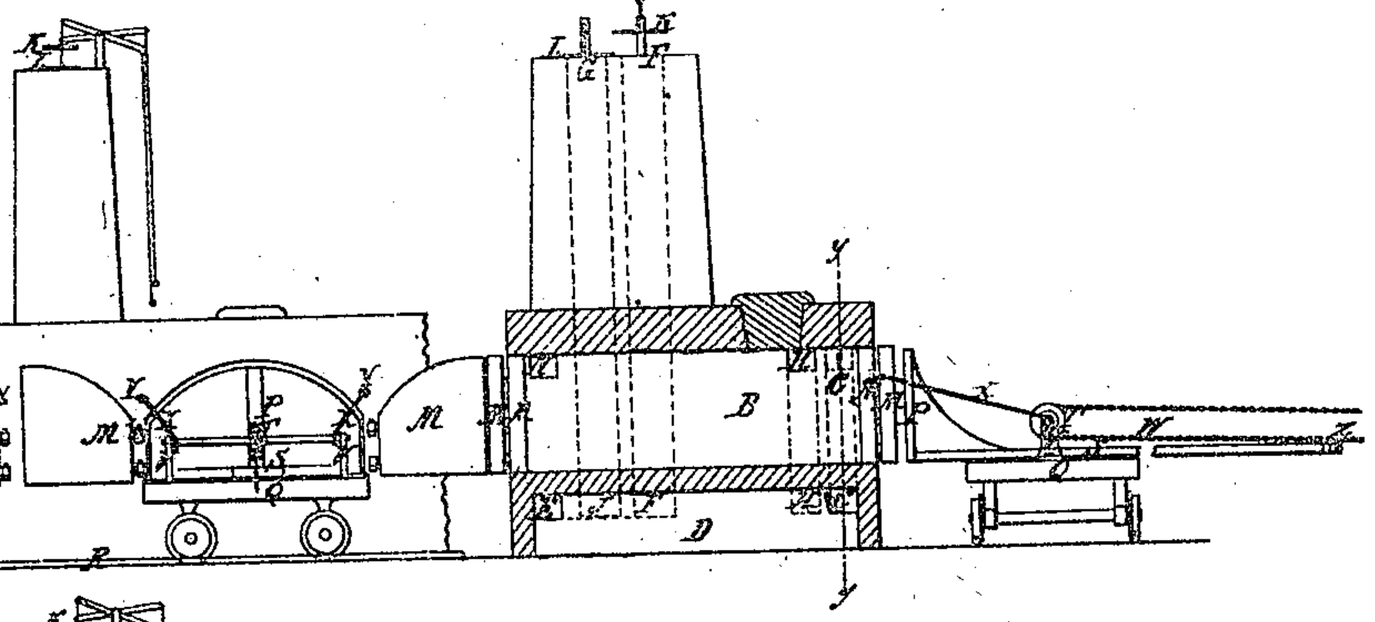


Fig. 2.

Fig. 3.

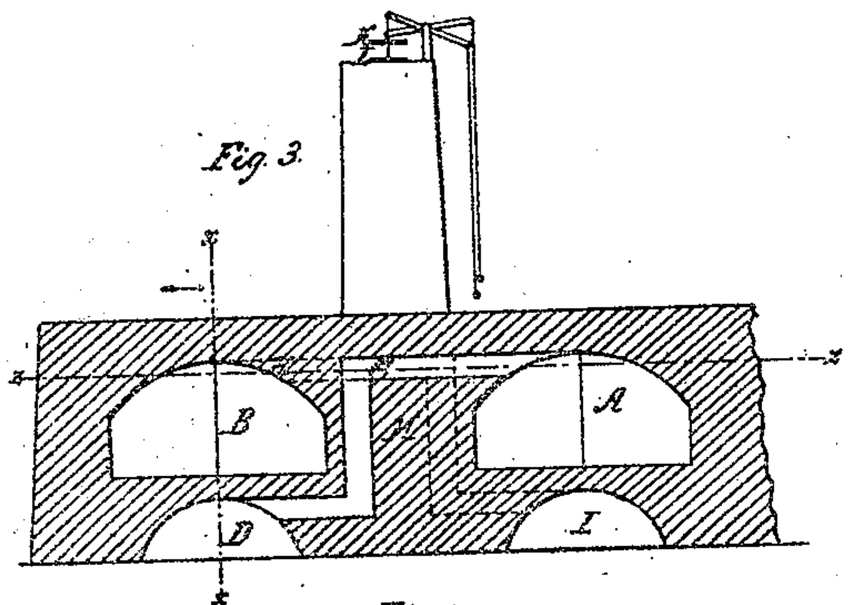
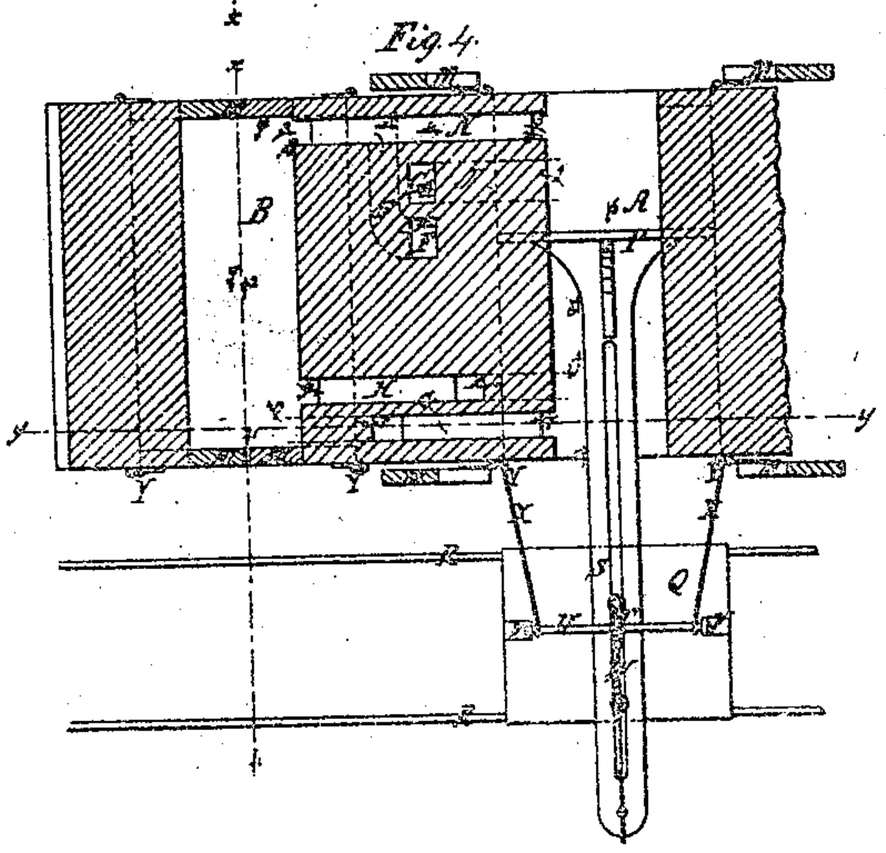


Fig. 4.



UNITED STATES PATENT OFFICE.

GUILLAUME LAMBERT, OF MONS, HAINAUT, BELGIUM.

IMPROVEMENT IN COKE-OVENS.

Specification forming part of Letters Patent No. 12,209, dated January 9, 1855.

To all whom it may concern:

Be it known that I, GUILLAUME LAMBERT, of Mons, in the Province of Hainaut and Kingdom of Belgium, have invented certain new and useful Improvements in Coke-Ovens; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention consists in combining the ovens by such an arrangement of flues and passages that the smoke and gaseous products generated in each in its turn during the earlier stages of the process of calcination may pass through and be burned in the next, in which the calcining process is always at a more advanced stage, and that the products of combustion of the combined ovens may pass under the floor of the first to heat the charge contained therein, and thereby expedite the liberation of the volatile products.

The accompanying drawings represent two coke-ovens constructed and combined according to my invention and having my improved discharging apparatus applied.

Figure 1 is a front elevation. Fig. 2 is a longitudinal vertical section of one furnace in the line *x x* of Figs. 3 and 4. Fig. 3 is a transverse vertical section of the two furnaces in the line *y y* of Fig. 4. Fig. 4 is a horizontal section in the line *z z* of Fig. 3.

Similar letters of reference indicate corresponding parts in the several figures.

A B are the ovens, which are arranged side by side. They are of parallel form longitudinally, or of the same size from end to end, and have doors M M at each end, which, when all opened, expose the whole transverse area of the ovens and leave a free passage right through them. These large doors, however, are only necessary to afford facility for discharging the whole charge at once, and when that is not desired a door of the usual size may be used at one or both ends. The ovens have a direct communication with each other by means of a flue, N, at the top part of the near end. From the front end of the oven A there is a flue, C, through which are taken the sections, Figs. 3 and 4, and which is also shown in dotted outline in Fig. 2, leading into an arched chamber, D, beneath the oven B, which said chamber communicates through a flue, E, at its rear end with the chimney F, which is situated between the ovens in the same stack with another chimney, G. From the front end of the oven B there is a flue, H, through which the section, Fig. 4, is taken, and which is also shown in dotted outlines in Figs. 2 and 3. This flue corresponds with the flue C of the oven B, and leads to an arched chamber, I, under the oven A, which chamber resembles the chamber D under the oven B, and has a communication with the chimney G by means of a flue, J. The flues E and H are represented in dotted outlines in Figs. 2 and 4, a part of the flue E being under the flue N. That part is concealed in Fig. 4. The chimney F is provided with a damper, K, at top, and the chimney G with a similar damper, L, so that the communication between one furnace and the chimney may be opened and that between the other and the chimney closed, as may be desired.

The process of coking in these ovens should be so conducted that there might be an interval of about ten hours between the time of charging one oven and that of charging the other, or that each is charged at the expiration of half the time necessary to complete the coking of the charge in the other. That being so, I will suppose that the oven B has just received a fresh charge, which is ignited, and that the charge in A has been for ten hours, or for about half the necessary time, submitted to the coking process. The doors of the oven A are all luted or hermetically closed, as also are the doors at the rear end of B. The damper K is raised to open the chimney F, and that L is lowered to close the chimney G. As much air as is necessary for the combustion of the smoke and combustible gaseous products arising from the fresh charge of coal is allowed to enter at the doors in front of the oven B, so that it may mix therewith, and pass with them through the flue N, to be burned in the oven A, in which they deposit a portion of their carbon. The incombustible products of this combustion escape at a very high temperature through the flue C into the chamber D, and are made to impart a portion of their heat by radiation to the oven B as they pass onward to the flue E, which leads to the chimney. The above-described course of the air, the gases, and products of combustion is indicated by black arrows in Fig. 4, numbered from 1 to 12, those in the chamber D and in

the lower flues being dotted. At the expiration of the time necessary for the calcination of the charge in the oven A it is withdrawn and a new charge put in immediately and as quickly as possible; but then the currents require to be reversed, and therefore the damper K is lowered to close the chimney F, and L is raised to open the chimney G. The doors of B are then luted or hermetically closed, and air is admitted to A in sufficient quantities for the combustion of the gaseous products of the coal, and with them passes through the flue N, to be burned in B, where they deposit a portion of their carbon, and from whence the products of combustion pass through the flue H, the chamber I, and the flue J to the chimney G, imparting a portion of their heat by radiation to the oven B. The course of the last-described current is indicated in Fig. 4 by red arrows lettered from *a* to *k*.

The advantages to be derived from this method of combining the ovens in pairs consist, first, in effecting the carbonization in less time, and, second, in producing a greater quantity of coke from a given quantity of coal. In ovens which contain two tons each I produce a very superior coke in twenty-four (24) hours, and the coal yields often above eighty (80) per cent. and seldom less than seventy (70) per cent. in weight of coke, the quantity of coke varying with the quality of coal. This yield greatly exceeds that produced by any other apparatus known to me.

Instead of placing the ovens side by side, they may be placed in pairs one above the other, with a suitable arrangement of flues, and an equally good result is obtained; but this arrangement is not adapted to the employment of the discharging apparatus I am about to describe.

The discharging apparatus consists of a cast-iron piston, P, capable of fitting so as to pass easily through the ovens, and mounted on a carriage, Q, which runs on a railway, R R, extending along the front of the whole range of ovens. The carriage is moved to the front of the oven that is to be discharged and the doors in front and rear are thrown open. The piston-rod S should be broad enough to keep the piston steady, and heavy enough to counterbalance the weight of the piston before it enters the oven, and the bottom of the piston and rod may have friction-rollers applied, to enable the piston to run easily through the oven. A pulley, T, is secured to a shaft, U, which runs in bearings in two standards, V V, on the carriage, and a chain, W, is attached to the end of the piston-rod, and after passing under the pulley returns for the purpose of attaching some suitable power, by which it may be drawn forward to force the piston through the oven and cause the contents to be discharged at the rear end. The carriage is held on the railway during the discharging operation by two stays, X, which swing on the shaft U, and are hooked to enter two rings, Y Y, which are secured on the front of every oven. The piston is drawn back by dragging on a chain, Z, attached directly to the end of the rod.

I do not claim combining a series of coke-ovens so as to be operated conjointly by the heat and volatile products of one passing to the next; neither do I claim heating the charge by means of the escaping products of combustion passing through flues wholly or partly surrounding the ovens; but

What I claim as my invention, and desire to secure by Letters Patent, is—

The manner herein described of combining the ovens by means of flues and passages, whereby the smoke and gaseous products generated in each during the earlier stages of the calcining process are burned in the next, where the process is at a more advanced stage, and the whole of the products of the combustion of the combined ovens are returned under the first, or that in which the process is least advanced, to assist in heating the charge contained therein and expedite the liberation of the volatile products.

G. LAMBERT.

Witnesses:
CHARLES MATI,
M. G. LENGHI.