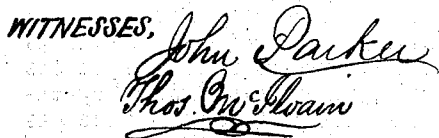


Improvement in Collecting and Using the Waste Gases for Blast Furnaces.

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Inventor.
J. E. A. B. de Langlade
By *Wm. H. Allen*
Harrison & Co.

UNITED STATES PATENT OFFICE.

JEAN E. A. B. DE LANGLADE, OF BORDEAUX, FRANCE.

IMPROVEMENT IN COLLECTING AND USING THE WASTE GASES FROM BLAST-FURNACES.

Specification forming part of Letters Patent No. 124,796, dated March 19, 1872.

SPECIFICATION.

I, JEAN EMILE ARTHUR B. DE LANGLADE, of Bordeaux, Department of Gironde, France, residing at Savignac Ledrier, Department of Dordogne, France, have invented an Improvement in Utilizing the Gases of Blast-Furnaces for the heating of other furnaces, or for other purposes, of which the following is a specification:

The object of the process, hereinafter set forth, is to utilize the gases of blast-furnaces for the heating of other furnaces, or for other purposes. These gases are taken at the blast-furnace mouth, and, having been previously deprived of the dust which they bring with them, and of the greater part of their watery vapor, are carried into regenerators, (such as the Siemens regenerator,) and thence into the furnaces. In this way only the quantity of fuel absolutely necessary for the operation is employed. The gases can be employed alone; or, if insufficient, mixed with a certain proportion of gas furnished by any suitable gas-regenerator. The heating furnaces may be a greater or less distance from the blast-furnaces. If adjacent thereto it is necessary to deprive the gases artificially by condensation and washing of the vapor and dust which they contain; but, if the furnaces are separated by any considerable distance, the gases are condensed spontaneously by cooling in their long journey, and the cinders are naturally deposited in the pipes. If artificial condensation and washing are necessary, it is well to cause a shower of cold water to fall into the vertical pipe which carries the gases from the furnace mouth to the floor of the forge, for the triple purpose of condensing the vapors, washing the gases of their dust, and giving them a sufficient pressure. After traversing these pipes, the gases pass through a condenser, suitably arranged, thence to the generators, and thence to the furnaces.

Description of the Accompanying Drawing.

In the annexed drawing, Figure 1 shows, in section, an arrangement which I have adopted for carrying out my invention; and Figs. 2 and 3, plan views of detached parts of the apparatus.

F is the blast-furnace, and G its mouth,

Near the latter at *a*, I arrange a conical cast-iron ring, through which the charge falls, while the gases pass round it into a chamber, *b*, provided with a slide-valve or damper, *r*. From the chamber B the gases pass into a pipe, T, which carries them to the apparatus for regulating the pressure. The latter consists of an open vessel, C, containing water kept at a certain level by means of a continuous feed and overflow. Over the case is inverted a sheet-iron vessel, C', from the top of which extend three tubes, *t*, *t*¹, *t*². The lower edge of the vessel C' is below the edge of the overflow, so that the vessel is sealed by the water, and the gases are prevented from passing underneath. A partition, *c*, surrounds the mouth of the tube *t*, and, when there is no pressure other than that of the atmosphere, the lower edge is immersed to a certain depth in the water in the vessel, this depth depending upon the pressure desired to be given to the gas in the bell. The pipe *t* communicates with the atmosphere, and the two other pipes, *t* and *t*², receive, the one the gases coming through the pipe T, the other those which flow out by the pipe T¹. In this way, when the pressure of the gas in the portion of the bell outside the partition *c* exceeds the determinate point, the water will fall below the edge of the partition, and allow the passage of a portion of gas, which will escape to the open air through the discharge-pipe *t*¹. The same result may be attained by an open vessel containing water at a constant level, and a bell having two pipes at its upper part. The bell is placed over the water in the case, as in the preceding apparatus, so that the edges only are immersed in the water. The two pipes are separated from each other by a partition, the edges of which are immersed in the water in the case to an extent corresponding to the pressure which it is desired to give to the flow of gas; one of the pipes serves to bring the gases from the blast-furnace; the other, to conduct them to the regenerators. To go from one pipe to the other the gas is obliged to pass under the edges of the partition, so that its pressure must be such as to force back the water below this partition, otherwise they cannot flow through the pipe for taking the gas and go to the regenerators. The pressure of

gas beyond the partition is thus prevented from exceeding the pressure which it is desired to maintain at the inlet.

Where this second apparatus is used and the furnaces do not consume all the gas which comes into the conducting-pipe, there should be, near the furnaces, an apparatus similar to the first of which I have spoken, with a discharge-pipe. To give the gas a determinate pressure at the regenerator, I use a very simple arrangement. The pipe *d* carries the water from the vessel C onto a perforated plate, *f*, situated at the upper part of the pipe T². The water falls in a shower into this pipe, and, consequently, propelling the gas with proportionate speed, which can be regulated at will. The water falls upon a plate, *g*, which disperses it, and thus completely washes the gases. The pipe T² communicates with an apparatus for preventing, or at least for localizing, the explosions resulting from the mixture of air and gas which may be produced. This apparatus is founded upon the principle of the Davy lamp. It consists of a vessel in which water is maintained at a constant level, and over which is inverted a vessel, Q', of a form represented in Figs. 1 and 3. In an enlargement in the upper part of the vessel are iron bars M, which have between them narrow spaces. These bars are constantly sprinkled with a jet of water, J, to prevent the choking of the spaces by dust, and to prevent the heating of the metal, which would diminish the security sought to be given to the apparatus. It is to be remarked that the larger the inter-

vals between the bars the more extensive the layer of bars should be. On leaving this last apparatus the gases pass through the pipes T³ and T⁴ to the regenerators, and then to the furnaces. A very simple way of imparting the desired speed to the gases, where there is a blowing engine, is by the use of a jet of air placed in the center of one of the pipes. This mode is equally efficacious in all cases where gas is to be put in motion, to give a draught to chimneys, for instance.

Claims.

1. Utilizing the gases of blast-furnaces for the heating of any furnaces or other apparatus, by causing these gases to pass into the Siemens or other regenerator.
2. The arrangement of apparatus, herein described, or equivalent arrangement, to impart the desired pressure to the gas after leaving the furnace.
3. The combination of the pipe T³, vessel Q' immersed in water, and plate *g*, as and for the purpose described.
4. The combination with the combustion-chamber of apparatus for washing and purifying the gases, as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

J. E. A. B. DE LANGLADE.

Witnesses:

JOS. EUGE. WENCKE,
HENRY RENARD.