2 Sheets—Sheet 1.

C. TESSIE du MOTAY & E. J. JERZMANOWSKI.

Apparatus for the Production of Gas for Metallurgical and Other Purposes.

No. 216,118. **Patented June 3, 1879.**

Figure 2.

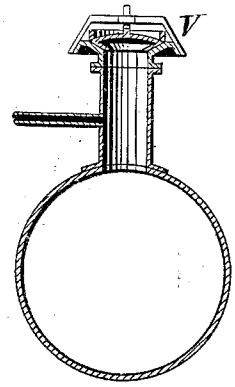
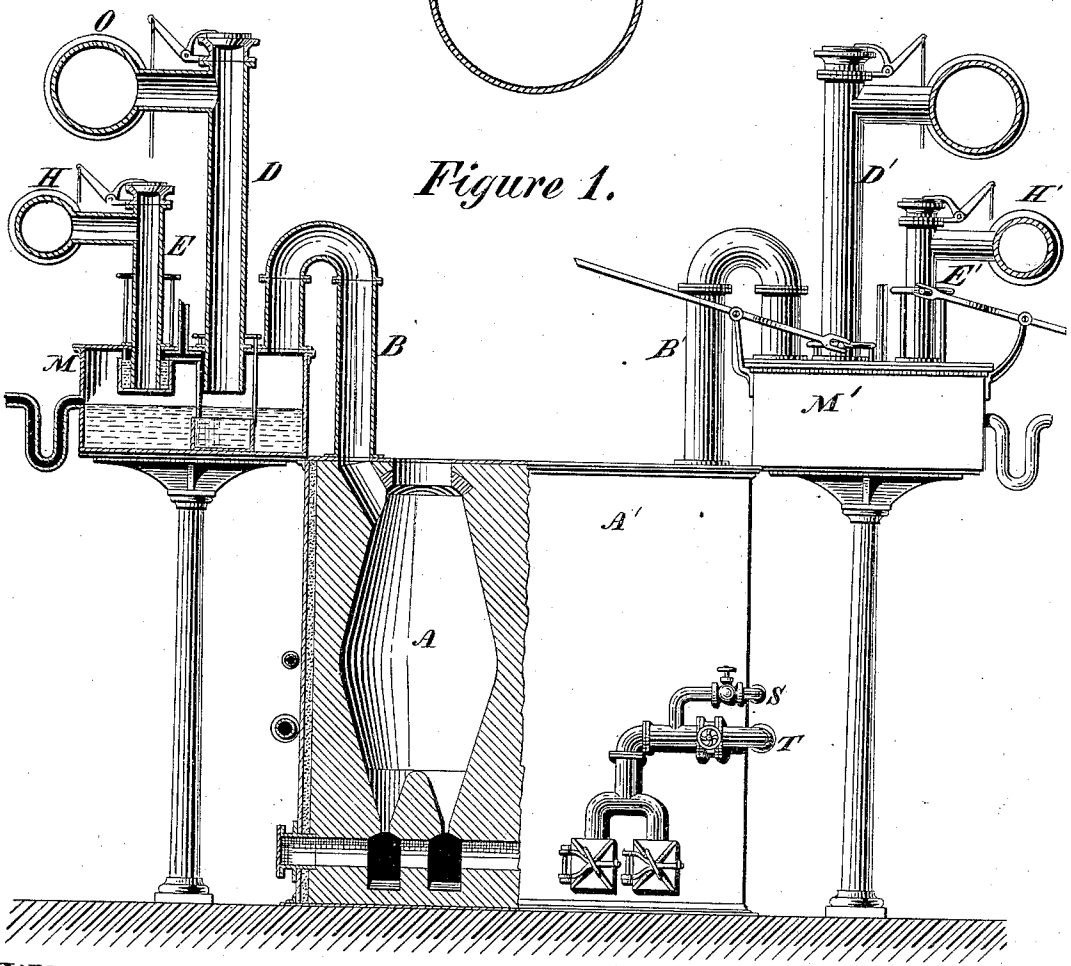


Figure 1.



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2 Sheets—Sheet 2.

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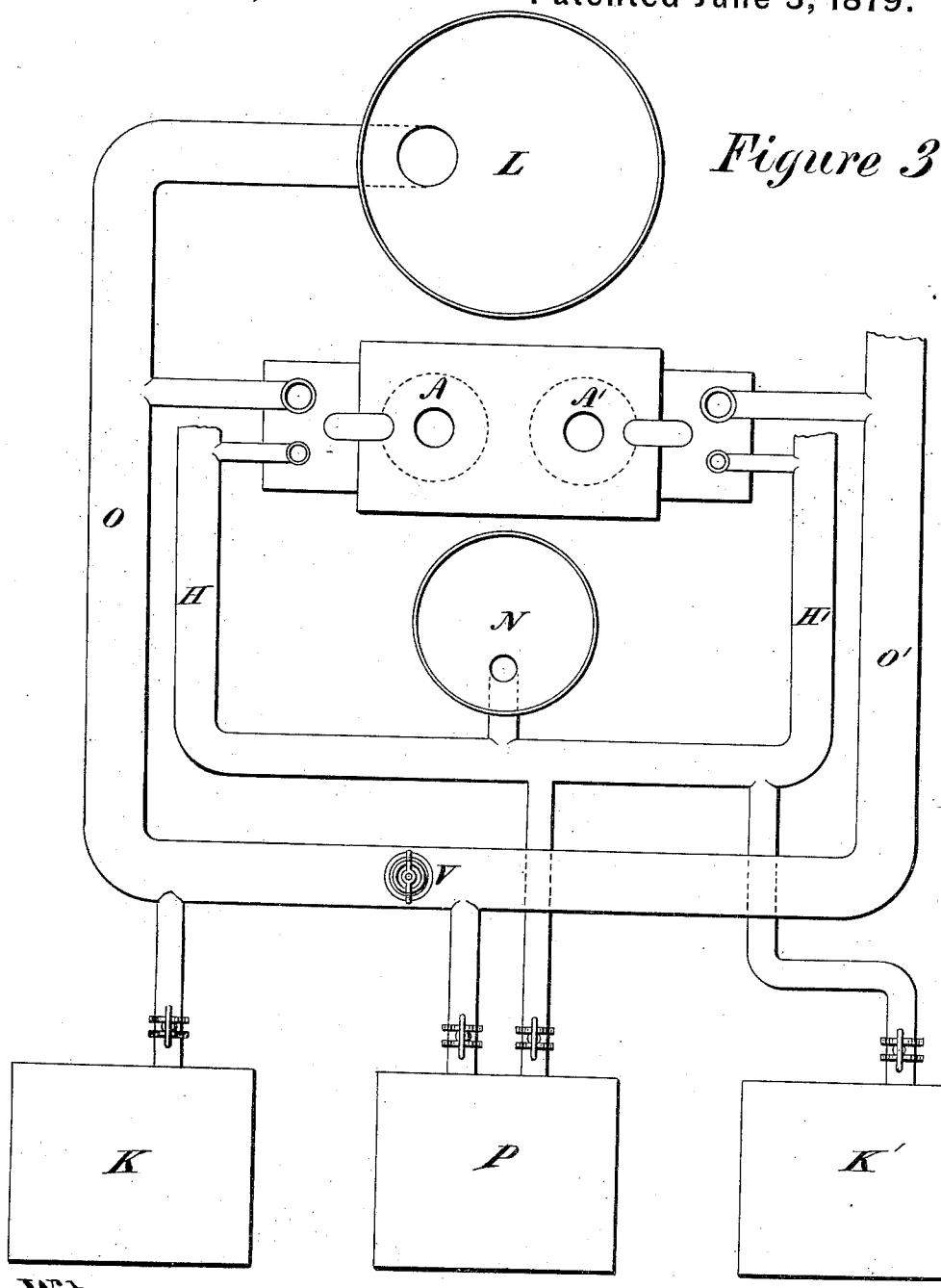


Figure 3.

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UNITED STATES PATENT OFFICE.

CYPRIEN TESSIÉ DU MOTAY AND ERAZM J. JERZMANOWSKI, OF NEW YORK, N. Y., ASSIGNORS TO EDWARD STERN, OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR THE PRODUCTION OF GAS FOR METALLURGICAL AND OTHER PURPOSES.

Specification forming part of Letters Patent No. **216,118**, dated June 3, 1879; application filed February 21, 1879.

To all whom it may concern:

Be it known that we, CYPRIEN TESSIÉ DU MOTAY and ERAZM J. JERZMANOWSKI, of the city and State of New York, have invented a new and useful Apparatus for the Production of Gas for Metallurgical and other Purposes, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

It has been found to be a matter of the utmost importance in the treatment of iron and in other metallurgical furnaces, such as those for the treatment of metals, glass, porcelain, &c., to obtain a constant supply of two or more gases burning at different temperatures, whereby different heats can be produced and carbonizing or oxidizing flames may be obtained.

Our apparatus is arranged to give a constant supply of two kinds of gases to a single furnace, or to burn either of these gases independent of the other; and in the carrying out of this invention we have employed two gas-generators for the production of two kinds of gas, each of these generators being so contrived that either kind of gas may be therein produced, and the pipes and connections being arranged in such a way that the gas produced in either generator may be supplied to the metallurgical furnace or furnaces through the same pipe.

The gases principally employed are carbonic oxide and other gases mixed therewith, produced by the reaction between air and hot coal or coke, and water-gas, produced by the reaction of hot coal or coke and steam or water.

Our invention will be clearly understood from the accompanying drawings.

A A′ represent two gas-generators, adapted to the production of either carbonic oxide or water-gas or carbureted hydrogen. Steam or air may be supplied to said generators by tuyeres S and T, so that either carbonic oxide or water-gas may be produced in the manner already well known and patented.

The two sides of the apparatus are duplicates, and one only will be described.

The gas produced in the generator A passes by pipe B into the hydraulic main M. With this two pipes, D and E, are connected, the pipe D being used to carry off the carbonic oxide, and the pipe H for water-gas or carbureted hydrogen. Within the hydraulic main are two water-cup valves, arranged to close the ends of the pipes D and E, and provided with suitable levers for their operation. Suitable purge-valves are also connected with pipes D and E.

The pipe O is shown as a branch pipe, passing on both sides of the generators, and the pipe H is similarly constructed. Connected with the pipe O is the gas-holder L, and the gas-holder N is similarly connected with the pipe H.

A number of generators, A A′, may be arranged in a row to still further insure the constant production of the gases.

K, P, and K′ represent metallurgical furnaces. The furnace K is only connected with the carbonic-oxide pipe, the furnace K′ with the water-gas or carbureted-hydrogen pipe, and the furnace P with both pipes. The connecting-pipes are of course provided with suitable valves. By means of these connections the different heats arising from the combustion of the carbonic oxide, water-gas, or carbureted hydrogen, or a mixture of them, may be obtained. Air (preferably heated) is injected at the point of combustion.

A safety-valve, V, is connected with the carbonic-oxide pipe O, for the purpose of relieving any excess of pressure in that pipe.

The operation of the apparatus can now be understood. Supposing the gas-generator A is being used in the production of carbonic oxide, then steam is shut off and air is forced in through its tuyere. The gas resulting passes out through pipes D and O, the pipe H being closed by its cup-valve, as shown in the left of Figure 1, which represents a partial elevation and partial section of part of my apparatus. Fig. 2 represents a detailed view of an ordinary safety-valve, and Fig. 3 a plan view of the connections. The gas produced in the generator A, passing into the pipe O, may be used in the furnaces K and P, and any excess passes into the holder L, which maintains a constant pressure and an even flow of gas through the pipe O. In case, however, more gas is produced

than can be contained by the pipes and holder, the excess of pressure is relieved by the safety-valve V.

The other generator, A′, is used for the production of water-gas or carbureted hydrogen by injecting steam through the tuyere S into the hot coal or coke. In this case the pipe D′ is closed by its cup-valve and the pipe E is open, so that the water-gas produced passes into the pipe H′, and may be used in the furnaces P and K′, any excess passing into the holder N.

By using alternately the generators A and A′ for the production of carbonic oxide and water-gas or carbureted hydrogen, an almost continuous supply of these two gases can be maintained, and with the aid of the holders this supply is made absolutely continuous and uniform. The obtaining of a continuous and even supply of gas for metallurgical purposes is of the utmost importance, because many of those processes depend for their success upon the amount of gas supplied and the chemical reactions resulting therefrom. By using the interchangeable generators shown, a considerable advantage is derived in the continuous production of the gas required, because a certain time is consumed in bringing the coal or coke to a sufficiently hot condition to produce water-gas, and the production of such gas upon the introduction of steam necessarily rapidly lowers the temperature; and if it is necessary to wait for a second heating by air forced in and a second incandescent condition of the coke, it is obvious that the supply of water-gas or carbureted hydrogen would be intermittent; but by using carbonic oxide which is produced in among the coal or coke from one generator and the hydrogen produced in the other retort, and by then connecting each alternately with the hydrogen and carbonic-oxide pipe, a continuous supply is readily obtained.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with a metallurgic gas-furnace, of two gas-generators, each for producing a different kind of gas, and of two governing-holders, one connected with each supply-pipe, for the purpose of insuring a constant supply of gas during periods of non-production, substantially as described.

2. In combination with a metallurgic gas-furnace, two gas-generators, each for supplying a different kind of gas to the same, and the pipes and connections shown, enabling a supply of either kind of gas from either generator, and two governing or regulating holders for maintaining an even pressure and an even flow, substantially as described.

3. In combination with a metallurgic gas-furnace, two gas-generators, each supplying a different kind of gas to the furnace, two governing-holders for maintaining a constant supply of gas, and one or more safety-valves connected with the pipes, for the purpose of preventing too great pressure in the supply-pipe and holders, substantially as described.

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