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J. VAJK

GAS MAKING

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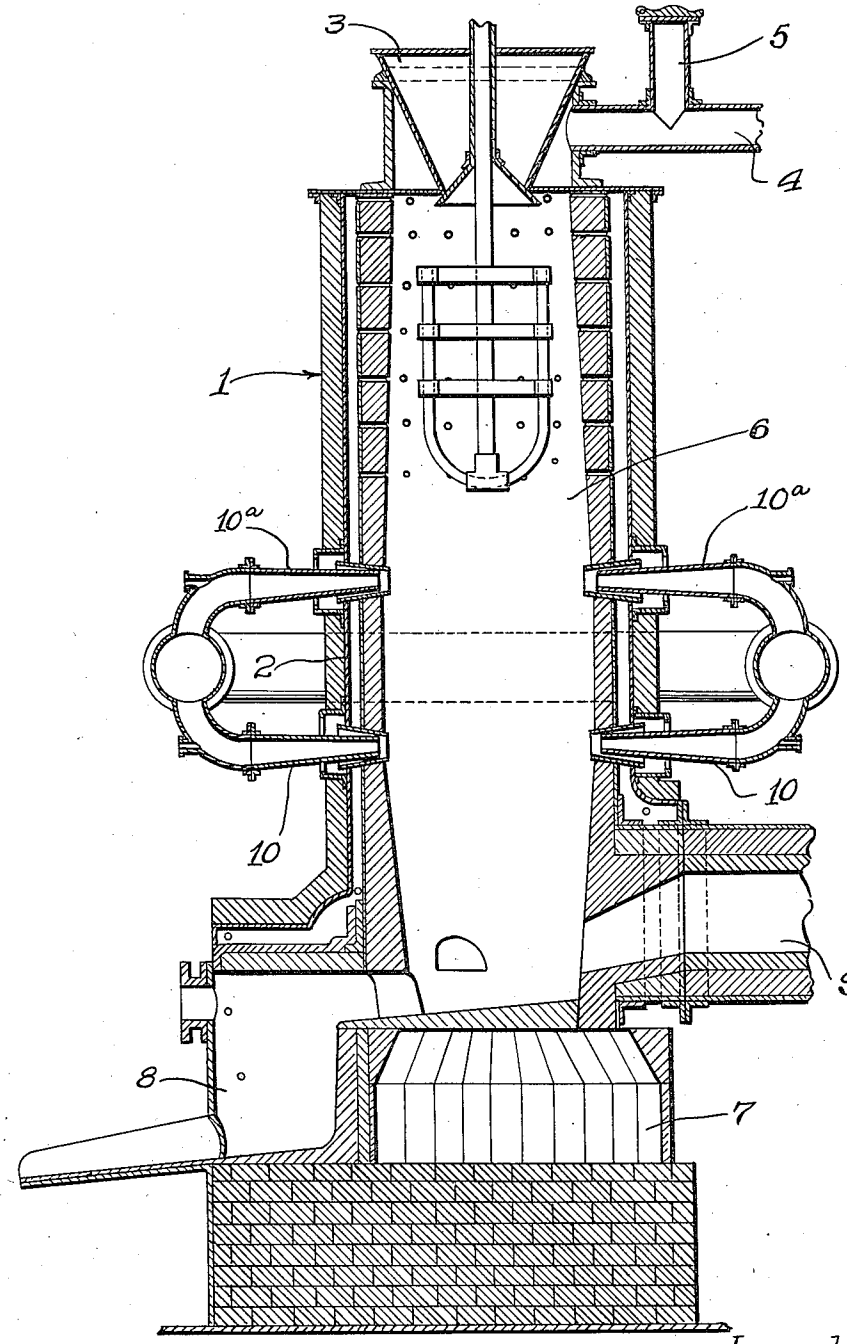

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GAS MAKING.

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To all whom it may concern:

Be it known that I, JOSEPH VAJK, a citizen of the Republic of Hungary, residing at Budapest, in the Republic of Hungary, have invented certain new and useful Improvements in Gas Making, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in metallurgical processes, and it is an object of the invention to provide a novel process for the production of highly heated generator gases free from water-vapor and tar, the gases thus produced being particularly adapted for use for metallurgical and ceramic purposes and in glass factories.

Another object of the invention is to provide a novel and improved process of this general character wherein the changing proportion of the moisture of the air does not cause any change or trouble during the operation of the furnace, whereby are obtained all the advantages of the James Gayley plant for dehydration without the necessity of using such plant.

An additional object of the invention is to provide a novel and improved process of this general character wherein the gases obtained, owing to the high dissociation temperature of the gases, permit the smelting of ores and the production of pig iron without the use of coke.

Furthermore, it is an object of the invention to provide a novel and improved process for producing gases whereby it is possible to melt pig iron directly and thus save the coke and limestone and in a manner whereby there is no loss in metal (waste) owing to the fact that the gases produced by the present process have no oxidizing effect and for which reason, as the composition of the pig iron remains unchanged during the melting process, a cheaper pig iron, that is, a pig iron with a smaller proportion of silicon, may be used.

When describing my invention, reference will be had to the accompanying drawings wherein is illustrated a vertical sectional view of a somewhat diagrammatic character of a blast furnace employed in connection with my improved process.

This furnace is constructed in the usual manner and wherein 1 denotes the furnace provided with a sheet iron shell 2. 3 denotes the charging apparatus and 4 the upper gas exit pipe for the crude gases. In communication with the pipe 4 is the bleeder valve or air escape 5.

6 denotes the stack mounted upon the base 7, and 8 denotes the forehearth as in the Krigar cupola furnace. 9 denotes the lower gas exit pipe and 10 and 10^a denote two series of blow pipes associated with the stack and spaced apart as required.

Before the furnace is put to work, it is thoroughly dried out and then filled with firewood, preferably logs of the size generally used in wood stoves, or the furnace may be filled with charcoal or coke, but when charcoal or coke is used, it is necessary to cover the bottom of the hearth with wood shavings and cord-wood. When kindling the fire, the lower openings of the furnace, together with the bleeder valve 5, are left open.

As soon as the fire reaches the lower series 10 of blow pipes, the blowing will be started with a weak pressure and when the fire reaches the upper series 10^a of blow pipes, the blowing also sets in at that point. After the air has thus been driven off, the bleeder valve 5 is closed and the smoke gases pass through the upper gas exit pipe 4 and through the gas ducts to the scrubbers, etc., tar gas purifying equipment or tar apparatus.

In the meantime, the stock-column descends and as soon as the next charge can be made, the materials which serve for the production of gas, that is, anthracite, bituminous coal, etc., are filled in, and to which limestone in proportion with the slag forming materials has been previously added. Meanwhile, the air pressure is gradually increased and the upper gas exit pipe 4 is closed or shut off so as to force the gases to pass into the downtake or lower gas exit pipe 9 through suitable mains to the desired place of destination. It is also to be understood that when the upper exit pipe 4 is shut off or closed, the openings of the forehearth 8 are closed or shut.

In case the gasification products, especially the tar products of the anthracite and firing wood, etc., or the bituminous coal, are to be utilized, the operation of the furnace is not discontinued but with every new charge, the upper gas exit pipe 4 is opened so that water-vapor and gases may be conducted to the place where they are collected,

purified and stored. As the quantity of these gasification products decreases and their temperature increases, the upper gas exit pipe 4 is shut or closed and this opening and closing said upper exit pipe 4 is repeated with each new charge.

If the tar only is considered as an undesirable by-product, the upper gas exit pipe 4 is opened only when combustibles of a high proportion of moisture are used and only while the moisture of the new charge evaporates. The remaining gasification products are thus forced to descend and to pass through the zone defined by the lower series 10 of blow pipes while the remaining water-vapor, carbonic acid, etc., are reduced by the incandescent coal and the tar is decomposed and gasified.

The carbonic acid produced in the blow pipe zones dissociates. The furnace zone below the lower series 10 of blow pipes is filled only with highly heated coal which has already passed through the upper zone of the furnace and the highly heated gases of dissociation temperature are continually passing through this incandescent coal mass, thus keeping the coal at a high temperature. In view of this, only highly dissociated gases escape through the lower gas exit 9 and are taken to the place where they are utilized.

In order to obtain and to retain this condition of gases, it is necessary, especially when anthracite or bituminous coal is employed, to use the hot blast and it is also preferred to use the hot blast with charcoal or coke, yet for the regulation of the temperature, hot air is blown only in one zone. In one zone; or ore, crude iron etc., is mixed with the burden or carbonic acid produced by the combustion of limestone, marble etc., or any other gases rich in carbonic acid or water-vapor is blown in.

Many unsuccessful experiments prove that the smelting of ores and also the production of pig iron has been impossible with the gases produced other than by the present process, as the gases produced by the process of the present invention, owing to their high dissociation temperature, also serve for this purpose without the necessity of using coke.

The gases obtained by the present process may be utilized in a twofold manner, resulting in considerable saving of combustibles for all metallurgical and ceremic purposes for which high smelting or heating temperature is required. Passing through the first stove, the gases, owing to their high dissociation, spread the necessary heat and then, when somewhat cooler but unchanged in their composition, they pass into a second stove where, like ordinary generator gases ignited under the action of air they likewise spread the necessary heat.

I claim:

A process for the production of highly heated generator gases consisting in closing the openings of the generator except an exit opening positioned below the incandescent combustibles within the generator, and in opening an upper exit upon every new charge for a period to permit the discharge of water-vapor and initial gasification products and gradually increasing the pressure within the generator, said upper exit being closed when the quantity of such gaseous products decreases and the temperature increases.

In testimony whereof I hereunto affix my signature.

JOSEPH VAJK.