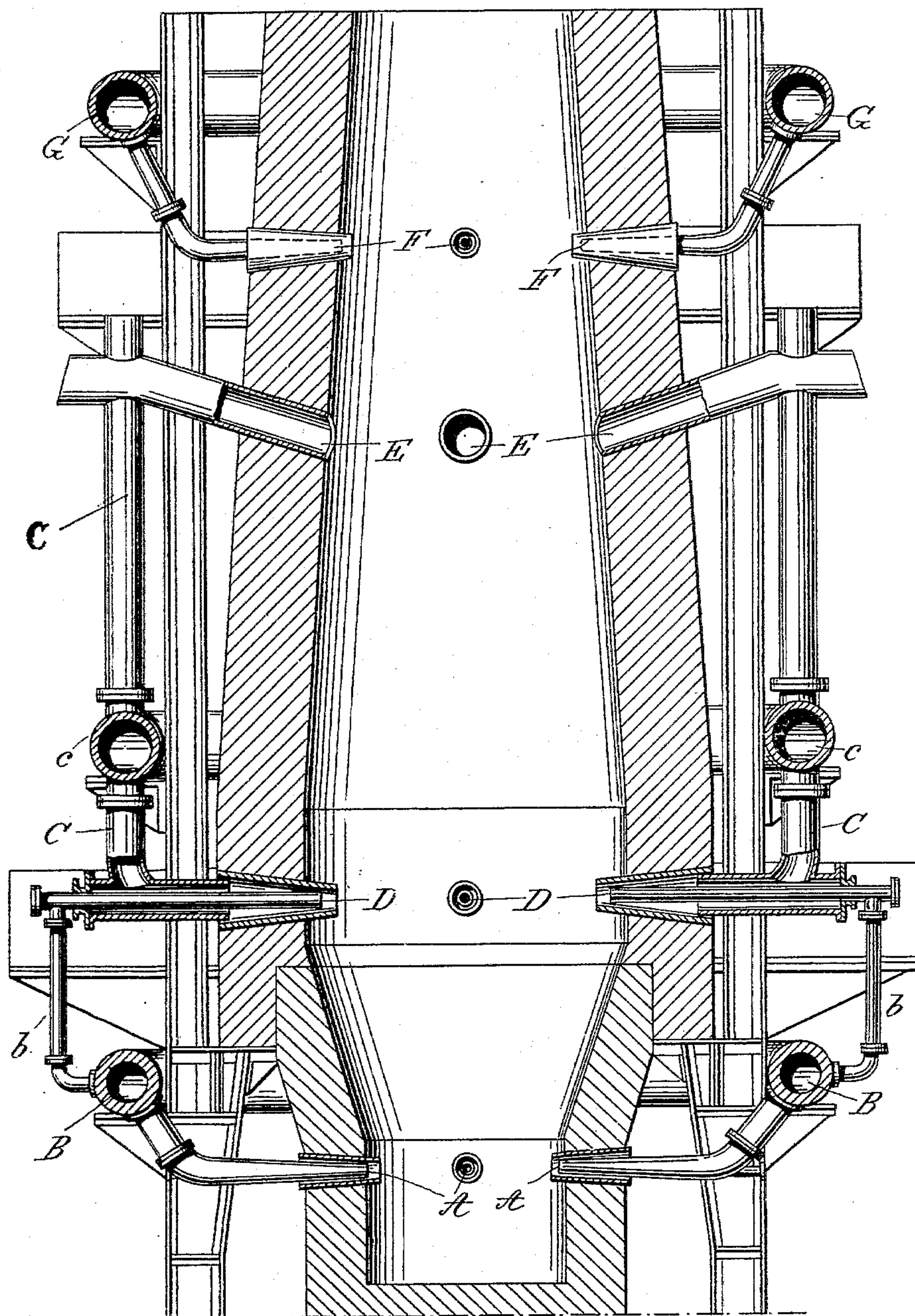


(No Model.)

A. WOLSKI.
BLAST FURNACE.

No. 598,128.

Patented Feb. 1, 1898.



Witnesses
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UNITED STATES PATENT OFFICE.

ADOLPHUS WOLSKI, OF KONSKIE, RUSSIA.

BLAST-FURNACE.

SPECIFICATION forming part of Letters Patent No. 598,128, dated February 1, 1898.

Application filed July 28, 1896. Serial No. 600,845. (No model.)

To all whom it may concern:

Be it known that I, ADOLPHUS WOLSKI, a subject of the Emperor of Russia, residing at Konskie, Russian Poland, Russia, have invented certain new and useful Improvements in Blast-Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a blast-furnace in which the furnace-gases are employed over again.

The invention consists in a blast-furnace in which, in the reduction of ores or metals, the furnace-gases are so utilized that a portion of the same is returned to the furnace at the height of the reducing-zone and another portion employed for heating the air to be introduced into the melting place or hearth of the furnace, while in the upper or preparatory space of the furnace cold air is blown in. A novel feature is the arrangement of nozzles delivering into the furnace at the height of the reducing-zone, which nozzles are in communication with a conduit for the waste gases withdrawn from the blast-furnace, the arrangement of nozzles for introducing hot air into the melting place or hearth, and the arrangement of nozzles for introducing cold air into the upper or preparatory space of the furnace.

The object of the invention is to effect a saving of fuel in the working of blast-furnaces.

The operation of the blast-furnace of this invention is as follows: The ores or metals—iron ores, for instance—in conjunction with fuel are charged into the furnace. Very hot air is blown into the melting place or hearth, whereby carbonic oxid (CO) is evolved as the product of incomplete combustion. This carbonic oxid passes over into the reducing-zone and there reduces the iron ores according to the formula $\text{Fe}_2\text{O}_3 + 3\text{CO} = \text{Fe} + 3\text{CO}_2$. This carbonic oxid serves to regenerate the furnace-gases according to the formula $\text{CO}_2 + \text{C} = 2\text{CO}$, and thus the reducing properties of the latter are completely utilized. To this end the furnace-gases from the upper part of the blast-furnace are intercepted and conducted back to the furnace at the height of the reducing-zone. In this way the reducing-gases move in a circle, and the furnace-gases conducted back into the reducing-zone of the furnace

are, with the carbonic acid there formed, regenerated to carbonic-oxid gas. The CO gases reduce the ores and pass off again as furnace-gases, and so on.

In the accompanying drawing the blast-furnace of this invention is shown in vertical section. A are the nozzles, which point into the melting place or hearth of the blast-furnace and are in communication with the hot-air pipes B.

C are pipes in communication by branch pipes E with the upper part of the furnace for the withdrawal of the furnace-gases, said pipes terminating at the bottom in nozzles D, pointing into the reducing-zone.

b are pipes branching from the hot-air pipes B to conduct the air for blowing the furnace-gases into the furnace.

c are pipes for conducting a portion of the furnace-gases into the air-heater. A branch pipe is led from any suitable part of the pipes c to the air-heating chambers, said branch pipe and hot-air chambers not being shown. Pipes C and c are connected.

F are nozzles for the introduction of cold air into the upper or preparatory zone of the furnace.

I am well aware that blast-furnaces having two blasts leading into the same have been made known through the British Patent No. 922 of 1867 and through the American Patents Nos. 417,691 and 53,104; but such blasts are for a purpose quite different from mine and correspondingly are located at a different height in the blast-furnace. Therefore they do not affect my invention.

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

In a blast-furnace the combination of a conduit leading from the upper part of the stack to a point above the bosh for conducting furnace-gases from the place occupied by the same to the reducing-zone, with twyers below the bosh for the hot-air blast and twyers near the upper end of the stack and above the conduit-outlet for the introduction of cold air, substantially as described and shown.

In testimony whereof I sign this specification in the presence of two subscribing witnesses.

ADOLPHUS WOLSKI.

Witnesses:

MARJAN MALAURKE,

MADYSDAW SZAUIAWSKE.