POOR DOCUMENT

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Electric Reduction of Iron Achieved By New Method

Production of Steel From Ore by Electric Furnace, in Combination With "Reducing" Furnace, Covered in Patents Taken Out By Toronto Man

(Toronto Globe.)

In connection with the press reports of Prof. Stanfield's investigations into the reduction of iron ores, it is interesting to note that similar investigations ing to note that similar investigations of the process follows ordinary steel mill practise to some extent. The climination of sulphur takes place in the reduction furnace, where it is roasted off before reduction is allowed to take place. The process is not alone applicable to the iron and steel industry since the patents are broad and basic enough to apply to the reduction of any metallic oxide ore.

Toronto Man Strikes on Method.

The electtric smelting of iron ores has been the subject of much investigation, and large sums of money have been spent by various parties. The problem is a difficult one, and a successful process has only recently been devised. This process is the invention of a Toronto man, James W. Moffat, M. E. I. C., and is the outcome of a protracted and difficult series of investigations extending through a number of years, the earlier attempts not proving commercially feasible. The outcome of these investigations is an extremely simple and successful process on entirely new lines which is capable of handling any ore in any physical shape. The elimination of sulphur is readily accomplished, and the production of pig or cast iron and steel of any desired carbon content is readily accomplished below that of the blast furnace and open hearth.

Discontinuous Process Evolved. Toronto Man Strikes on Method.

Discontinuous Process Evolved. granted in Canada, the United States and foreign countries makes use of two distinct steps; the reduction of the ore and the melting down of the metallic sponge thus produced in the electric furnace. The process is a discontinuous one; that is to say, the raw naterials are fed in batches, and the teel or iron produced in separate heats his has been found to be the only ethod by which steel can be successmethod by which steel can be successfully made, and the use of individual heats is necessary for the refining operations upon which the metallingy of steel is band. The open hearth, the Bessemer converter and other and older steel-making processes are all of this type. The blast furnace used in the production of pig iron is, however, a nechanism which operates continuously and uniformly, and previous attempts along the lines of electric smelting have endeavored to follow the same principle. It should be noted that no intermediate step is necessary for the production of steel. When the ore is reduced it is at once converted directly into steel.

Utilizes Carbon-monoxide Gas.

Heat is necessary for the reducing operation, and the use of electric heat for this purpose has been proven to be very expensive. During the reduction of any oxide ore, carbon monoxide, an inflammable gas of high heat value, is given off, and in present day practise full use is not made of this source of heat. Blast furnace gas is used, mainly to heat the enormous volume of air passed through, and previous electric furnace reduction processes have made little attempt to conserve this source of heat. In the

and previous electric furnate reconserve this source of heat. In the present process full use of this by-product is made to such good advantage that theoretically no fuel beyond that required for reduction is needed. In practise, however, a small amount of heat must be added by a further consumption of fuel, oil, gas or coal, to take care of heat losses, etc.

It is not the process will lie, since the consumption of fuel and electrical energy will be very much lessened. The amount of coal or other carbonaceous fuel can be reduced to one-quarier to one-third of that required by the blast furnace. Can Develop Smaller Properties.

Can Develop Smaller Properties.

The blast furnace is an enormously expensive thing and can only be built in large sizes. The present reduction process is applicable to the requirements of any plant and is capable of handling as large or as small an output as desired. This fact makes it of much economic importance to Ontario, and will prove to be the means of developing the smaller mineral properties and waterpowers with which the province abounds.

Details of the Process. An outline of the process will be of interest to readers of The Globe, and in principle it is as follows: In the use of interest to readers to The Grobe, and in principle it is as follows: In the use of any ore certain preliminary steys are necessary. If it carries very much rock matter or gangue it is first crushed and concentrated, the major portion of the foreign materials being thus removed. In every case it is necessary that the ore be reduced to a state of fine subdivision, and in this state it is charged into the reducing furnace. Here carbon is added and removes the oxygen from the ore by a number of chemical reactions which are controlled by very fixed physical laws. The carbon contact does not to any great extent reduce the ore which is done by carbon monoxide gas. This gas in absorbing the oxygen of the ore is converted into carbon dioxide gas, which is again in turn charged back to the carbon monoxide through taking up carbon. The excess gas given off during reduction is used in the supplying of heat necessary for the reaction. The now metallic iron still in the form of fine

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To move, 3, 1914, "says the study, "a say show she the continue and 25 per cent by the government, 25 per cent by the g



