

factor of the Keller furnace, such doubt cannot arise regarding the figures obtained with the Heroult furnace for the absorption of electric energy in the Government experiments on account of its remarkably high power factor 0.919.

Moreover, since the cost of alternate current generators increases with increase of capacity, furnaces with high power factors (which can utilize a high percentage of the capacity of the generators) will be more economical as regards the first cost of the electrical installation of an electric smelting plant than furnaces with low power factors.

MODIFICATION OF EXPERIMENTAL FURNACE FOR COMMERCIAL PRODUCTION OF PIG IRON.

Probably the largest unit which can at present be constructed on the model of the experimental furnace will not exceed 1,500 H. P. The construction of the experimental furnace to fit it for the production of pig iron on a commercial scale will require to be modified in the following important particulars:—

- (1). The top of the furnace requires to be modified to permit of the application of labor-saving machinery for charging.
- (2). Provision requires to be made for the collection and utilization of the carbon monoxide produced by the reduction of the ore; this involves also the protection of the charcoal of the charge from combustion on top of the furnace.

The greater capacity insuring less loss of heat by radiation and the modification of the furnace to permit of the utilization of the carbon monoxide will materially increase the output beyond that ascertained by the experimental furnace. The experiments indicated that under *normal* conditions about 11.5 tons were produced by an expenditure of 1,000 E. H. P. days. (See runs Nos. 8 and 13). It is, therefore, not unreasonable to assume that under similar conditions with a properly constructed plant the output per 1,000 E. H. P. days would certainly reach 12 tons. This figure has been adopted in calculating cost of production per ton of pig.

The protection of the charcoal of the charge from combustion on top of the furnace will materially decrease the amount of charcoal necessary for reduction and consequently lessen the cost of this item. This saving has, however, not been taken into account in the estimate of cost.

On account of the value of the product, the smelting of roasted nickeliferous pyrrhotite by the electro-thermic process, as carried out with the