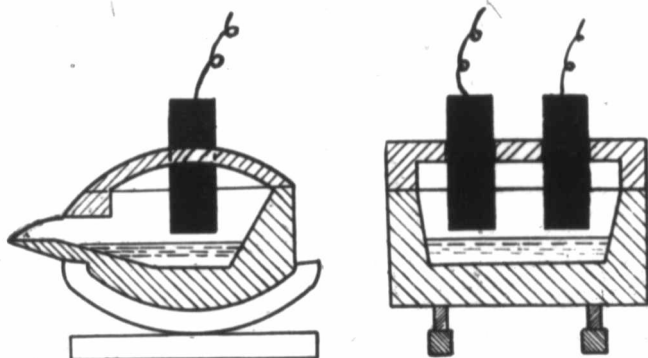


ping openings is clearly shown in figure 1, while a pipe through the lid removes the carbon monoxide resulting from the reaction.

An alternating current arc is maintained between the carbons which can be drawn apart by suitable mechanism, and the ore mixed with coal or charcoal is fed in at the side of the furnace and lies below the arc. The ore must therefore be heated by conduction and radiation from the intensely hot arc which occupies the upper part of the furnace, the method of heating being like that in the open hearth furnace.

An alternating current of 2,000 ampères at 170 volts is used in the arc which, when the furnace has become hot, traverses the whole width of the furnace and consumes about 450 horse power.

While the use of the electric arc has certain points in its favour it seems unlikely that the greatest economy can be obtained in this way. Thus, for example, the heat can only penetrate the ore by conduction through the mass and, meanwhile, heat is being lost by



THE HEROULT FURNACE.*

Fig. 2.

conduction through the upper walls of the furnace. Also the ore is not pre-heated before entering the fusion chamber and the waste gases by passing through the arc on their way out, tend to escape at a very high temperature and so to waste heat which might have been employed in pre-heating the ore charge.

In fact, both the pre-heating and the partial reduction of the ore might be effected by the hot carbon monoxide escaping from the furnace. The furnace was working in Italy on local iron ores and produced steel directly from the ores. Dr. Goldschmidt concluded that the steel would cost \$18.80 per metric ton and that the process could not be economically introduced into Germany.

* Electro-Chemical Industry, vol. I., 1903, p. 449.