

CHAPTER II.

DESCRIPTION AND CLASSIFICATION OF ELECTRIC FURNACES.

The Electric Furnace may be described as an appliance in which materials can be submitted to a high temperature by the dissipation of electrical energy. This definition does not include all cases of electrical heating; and with advantage might be limited to the production of temperatures above a red heat. In a number of instances such as the production of sodium and aluminium, the electric current is required mainly for isolating the metal by electrolysis, and only incidentally for producing heat. These processes are usually considered to be furnace operations, because a high temperature is produced; and it has been suggested, by Mr. J. Wright,* that electrolysis should be classed as a furnace process, when fused anhydrous salts are employed; excluding the more familiar electrolytic processes in which aqueous electrolytes are used.

Heat is produced whenever an electric current encounters any resistance to its flow; the energy, producing the current, being transformed into heat.† Even the best electrical conductors oppose some resistance to the flow of an electric current, and work must consequently be done in maintaining the current. If an electric circuit is made, in part, of a good conductor (such as a short, stout copper cable) and, in part, of a poor conductor (such

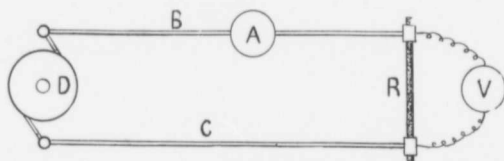


Fig. 9.—Electric Circuit.

as a thin rod of carbon) the greater part of the heat will be produced in the poor conductor, which may even become red hot, while the remainder of the circuit remains cool.

*Author of "Electric Furnaces and Their Industrial Application."

†A part of the energy is sometimes changed into chemical energy or into other forms of electrical energy.