

around C, and in the heat of the arc the lime is reduced by means of the coke to the metal calcium, and this in turn reacts with

more coke to form a carbide. These reactions may be represented by the following chemical equations, which also indicate the relative amounts of lime and coke to use in the charge:—



The calcium carbide, when formed, is fusible at the temperature of this furnace, and forms a pool beneath the electrode, B C, and by gradually raising this electrode, a mass of carbide is built up. When the crucible is nearly filled, the operation is stopped and the crucible allowed to cool before turning out the block of carbide.

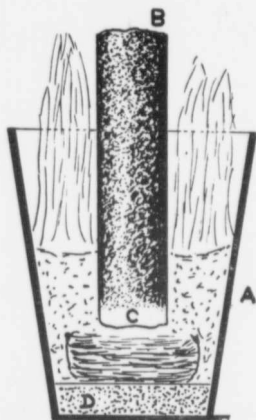


Fig. 7.—Willson's Carbide Furnace.

The carbonic oxide produced by the reaction escapes and burns in the upper part of the crucible, as is indicated in Fig. 7. Many other forms of carbide furnaces have been devised, and are now being operated on a large scale, some of these being intermittent, like the Willson furnace, whilst others are continuous in action. The world's production of calcium carbide in 1904 amounted to 90,000 tons. The value of calcium carbide depends, as is well known, upon the ease with which it acts upon water to form the valuable illuminating gas, acetylene.

Another important carbide, produced in the electric furnace, is carborundum, a carbide of silicon, SiC. The discovery of carborundum by E. G. Acheson in 1891 is described by himself in an interesting lecture on "Discovery and Invention."* Mr. Acheson was attempting to harden clay by impregnating it with carbon in an improvised electric furnace. After the experiment he noticed a few bright specks at the end of the carbon electrode. These specks were found to be hard enough to cut not only glass, but

*The Electric Journal, Pittsburgh, 1906.