

F1G. 80

cities of a few substances compared with air, are as follows :---

Air	1.00
Glass	3.013 to 3.258
E bonite	2.284
Gutta-percha	. 2.462
India-rubber	.2.220 to 2.497
Paraffin (solid)	.1.994
Shellac	2.740
Sulphur	.2 580
Turpentine	
Petroleum	.2.030 to 2.070
Carbon bisulphide	.1.810
Vacuum	0.99941
Hydrogen	.0.99967
Carbonic acid	1.00036

Faraday, who proposed the term specific inductive capacity, employed in his experiments a condenser consisting of a metallic sphere A, Fig. 79, placed inside a large hollow sphere B.

The concentric space between A and B was filled with the substance whose specific inductive capacity was to be determined.

Capillary Electrometer.—An electrometer in which difference of potential is measured by the movements of a drop of sulphuric acid in a horizontal tube filled with mercury.

The horizontal glass tube with a drop of acid at B, is shown in Fig. 80. The ends of the tube are connected with two vessels, M and N, filled with mercury. If a current be passed through the tube, a movement of the drop *towards the negative pole* will be observed. Where the electro-motive force does not exceed one volt, the amount of the movement is proportional to the electro-motive force.

Carbon.—An elementary substance which occurs naturally in three distinct allotropic forms, viz.: charcoal, graphite and the diamond.

Carbon, Artificial.—Carbon obtained by the carbonization of a mixture of pulverized carbon with different carbonizable liquids.

Powdered coke, or gas-retort carbon, sometimes mixed with lamp-black or charcoal, is made into a stiff dough with molasses, tar, or any other hydro-carbon liquid. The mixture is moulded into rods, pencils, plates, bars or other desired shapes by the pressure of a powerful hydraulic press. After drying, the carbons are placed in crucibles and covered with lampblack, or powdered plumbago, and raised to an intense heat at which they are maintained for several hours. By the carbonization of the hydro-carbon liquid the carbon paste becomes strongly coherent, and by the action of the heat its conducting power increases.

To give increased density after baking, the carbons are sometimes souked in a hydro-carbon liquid, and subjected to a re-baking.

Carbon Electrodes for Arc Lamps.—Rods of artificial carbon employed in arc lamps. Carbons for arc lamps are generally copper-coated, so as to somewhat decrease their resistance, and to ensure a more uniform consumption. They are sometimes provided with a central core of soft carbon, which fixes the position of the arc and thus ensures a steadier light.

Carbon Holders for Arc Lamps.—Various clamping devices for holding the carbon electrodes of an arc lamp in the lamp rods.

Carbon Telephone Transmitter.— \blacktriangle telephone transmitter consisting of a button of compressible carbon.

The sound-waves impart their to-and-fro-movements to the transmitting diaphragm, and this to the carbon button thus varying its resistance by pressure. This button is placed in circuit with the battery and induction coil.

Carbonization, Processes of.—Means for suitably carbonizing carbonizable material.

Carbonizable material is placed in suitably shaped boxes, covered with powdered plumbago or lamp-black, and subjected to the prolonged action of intense heat while out of contact with air.

The electrical conducting power of the carbon which results from this process is increased by the action of the heat, and, probably, also by the deposit in the mass of the carbon, of carbon resulting from the subsequent decomposition of the hydro-carbon gases produced during carbonization.

When the carbonization is for the purpose of producing conductors for incandescent lamps, in order to obtain the uniformity of conducting power, electrical homogeneity, purity and high refractory power requisite, selected fibrous material, cut or shaped in at least one dimension prior to carbonization, must be taken, and subjected to as nearly uniform carbonization as possible.

Carbonized Cloth for High Resistances.—Discs of cloth carbonized by heating them to an exceedingly high temperature in a vacuum, or out of contact with air.

Af er carbonization the discs retain their flexibility and elasticity and serve admirably for high resistances. When piled together and placed in glass tubes, they form excellent variable resistances when subjected to varying pressure.

Carbons, Cored, for Arc Lamps. —A cylindrical carbon electrode that is moulded around a central core of charcoal, or other softer carbon.

These carbons, it is claimed, render the arc light steadier, by maintaining the arc always at the softer carbon, and hence at the central point of the electrode.

A core of harder carbon, or other refractory material, is sometimes provided for the negative carbon.

Carbons, Concentric, Cylindrical.—A cylindrical rod of carbon placed inside a hollow cylinder of carbon but separated from it by an air space, or by some other insulating, refractory material.

Sometimes Jablochkoff candles are made with a solid cylindrical electrode, concentrically placed in a hollow cylindrical carbon.