by itself. Certain metals have the necessary desire for oxygen, some of them acting satisfactorily at ordinary temperatures and others only at high temperatures. Thus, if a piece of metallic sodium about the size of a pea be dropped on some water in a dish, it will be seen to move about rapidly on the surface of the water, gas being given off with effervescence; if a lighted match or taper be touched to the gas, the latter will take fire.

$$Na + H_2O = NaOH + H$$

Certain other metals will decompose water at high temperatures. Thus, if steam be driven into one end of an iron or porcelain tube filled with tacks or iron shavings, and kept at a high temperature, hydrogen may be collected at the other end of the tube, while the iron becomes covered with hammer scale.

$$3Fe + 4H_2O = Fe_3O_4 + 8H$$

A similar action, rust being formed, takes place at ordinary temperatures, only *extremely* slowly.

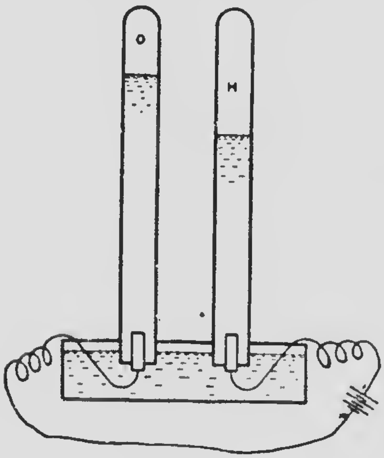

FIG. 6.

If an electric current be passed through water (containing a little sulphuric acid), hydrogen is given off at one pole and oxygen at the other. The apparatus employed may be of various forms, one of the simplest patterns being that illustrated in the figure. The wires coming from a battery of four or five cells, arranged in series, terminate in pieces of platinum foil (which is not acted upon during the experiment, as copper would be), and these pieces