Water Gas.—About 1784, Cavendish discovered that hydrogen, which had been previously known as "Inflammable Air," was one of the component parts of water, but no practical use was made of the discovery until 1824, when J. H. Ibbetson took out a patent for a special method of making illuminating gas, by passing steam through a mass of incandescent carbon; and even then no apparatus was designed that could be considered a commercial success, until about 40 years after. Among the water gas processes in use to-day, that of the Loomis-Pettibone is one of the most widely known in America.

This plant consists of two generators from five to eleven feet in diameter, and from twelve to eighteen feet in height, and steam boiler, with necessary valves, &c. The generators are lined with firebrick, with firebrick arched grates, ash-pit and flue to boiler in the bottom. They are provided with a door on top for firing and admission of air, two cleaning doors above the grate and one below the grate into ash-pit.

The vertical boiler is of the multitubular type, and of suitable size to correspond to the generators, and is connected at its base with the generators. An exhauster is connected with the top of the boiler beyond the producer valve.

In Operation.

The generators are supplied with a layer of coke about five feet thick, which is ignited at the top, the exhauster creating a downward draft; when this body of fuel is ignited, coal is charged at intervals, raising the fuel bed to about eight feet above grates, and there maintained.

Bituminous coal is generally used and is fed through the feed door in the top of the generator. Air is also admitted through the same doors and by means of the exhauster is drawn down through the grates and ash-pits of the generators, up through the vertical boiler and then to scrubbers and exhauster, from which it is delivered to gas holder.

When the exhauster has brought the fuel up to a state of incandescence, the charging doors are closed, and valves altered, so as to direct the flow of gas as desired. Steam is then turned into the ash-pit of one generator, and, in passing through the incandescent coal, is decomposed, forming gas. From the first generator the gas passes through the connecting pipes shown near the top of the generators, and down through the second generator, then into the base of boiler and up through the same, and thence, after being washed in a scrubber, is passed to gas holder.