

Water gas is made for about five minutes, when the temperature of the fuel beds having been considerably reduced, the steam is shut off and the process reversed.

The process of making water and producer gas is alternated at intervals of five minutes or so. In making the second run of water gas the course of the steam is reversed, i.e., the steam is turned into the ash-pit of No. 2 generator and down through No. 1.

While the fires are being blasted, and during the making of water gas, the hot gases, in passing through the boiler, give up a large proportion of their heat for the production of steam to be used under generators for decomposition.

The great advantage of the double generators is that as all the gas is made to pass through the fire, the tarry matter from the coal is converted into fixed gases that can be conducted any distance through ordinary pipes, and at any temperature or pressure.

In operation, a plant, such as I have described, will produce about three volumes of producer gas to one of water gas. The production per ton of bituminous coal is about 35,000 to 45,000 cubic feet of water gas, and 100,000 to 150,000 cubic feet of producer gas.

This system is, however, more especially adapted to large power plants, and, except under special conditions, is of greater capacity than is required for small units.

*Semi-Water Gas.*—In order to produce a cheap apparatus for small plants, extensive experiments have been made, resulting in what is known as the semi-water gas producer. Since then a large number of different makes have been placed on the market, in sizes from 8 horse power and upwards. This is an evolution of the water gas apparatus, i.e., in the water gas plant, steam and air are supplied alternately, whereas in the semi-water plant, the steam and air are supplied at the same time, and the amount of steam so reduced in volume as not to interfere with the temperature of the fuel (usually about one pound of steam per pound of fuel consumed). The general form of apparatus comprises the following principle parts, viz.:—

- 1.—The producer, or generator.
- 2.—The saturator.
- 3.—The hydraulic box.
- 4.—The coke scrubber.

*Producer.*—The producer is a cylindrical steel shell lined with firebrick and fitted with a revolving grate. There is an annular space between the brickwork and the outer shell, through which