Producer Gas and Gas Producer Plants

Third of a Series of Articles Appearing in the Power Edition, Taking up This Subject in an Educative Way. Information Has Been Gleaned from Various Noteworthy Authorities. Names of Authorities Being Given. Absolute Confidence Can be Placed in all Statements and Claims, as They Come from Some of the Highest Authorities on This Subject. This Series of Articles will be Followed by Another Series on Large Power Gas Engines. Each Article will be Complete in Itself. This Article Deals with the Suction Gas Plant and Its Parts.

By J. C. Armer

The Suction Producer Plant.

The historical sketch shows us that the suction plant is a development of the pressure plant, and in spite of the short time since the first successful suction plant was built and operated, it has become exceptionally popular. Indeed it must be said that the suction plant is responsible for the remarkable progress that producer gas has made in America, and for the prestige it has gained. In Canada certainly it is the suction plant which is arousing so much interest among manufacturers, probably one reason being that the size of units required are more to be desired for various reasons in the suction producer than in the pressure plant.

Operation of Typical Plant.

Since this paper is meant to give special attention to suction plants, it is in keeping that a detailed description of the operation of a typical suction plant should be given. The general principles involved in the manufacture of producer gas have already been explained in the previous articles of this series, and need not again be introduced.

ed, as shown in the upper portion of the scrubber. As the gas makes its way up through the coke it is washed, to remove dust and particles of tar if possible, and is thoroughly cooled. After having passed through the water seal and through the scrubber the gas is quite damp; and it is to dry the gas and to further purify it from all objectionable matter that it is drawn through D, the sawdust purifier. From thence the gas in some plants passes through what is called a pressure equalizer, of which more will be said later, before being taken into the engine through the mixing chamber.

The generator is provided with coal by means of the charging box, shown in 3, which is a device to feed fuel into the generator without the admission of air.

The plant is started up by blowing up the fire in the generator with a hand blower shown at 4, the valve to the engine being closed and that to the ventilator shown at 5 being opened.

As soon as the fire is in a sufficiently high state of incandescence and the gas is of good quality, of which more will be said later, the hand blower is shut off, the ventilator valve closed and the engine started. Steam will have been produced by the passage of the poor gases through the vaporizer and up the ventilator, so that when the engine is started it will draw the required mixture of air and steam up through the generator giving the correct gas composition to start operating upon.

of cast iron or sheet iron, containing refractory lining which forms a retort, a grate and an ash-pit. The cast-iron mantle is only used for small generators, as its cost is prohibitive in the case of large sized generators. The riveted sheet-iron casing is also used in the latter case to reduce the weight.

The shapes of the generators are usually cylindrical, but are often rectangular and sometimes even conical.

The different parts of the generator, if made of sheet iron, are held together by means of angle irons forming yokes, a sheet of asbestos being interposed. If the parts are made of cast iron they are connected in the same manner as pipe joints, and the joints are packed with compressed asbestos. These methods of connection allow free expansion of parts and thus secure joints, the importance of which can be realized when the ill effects of air leakage into the generator are considered; that is the interfering with the quality of the gas, and the danger of the production of an explosive mixture.

Between the external mantel or shell, shown at 6 in Fig. 1, and the refractory

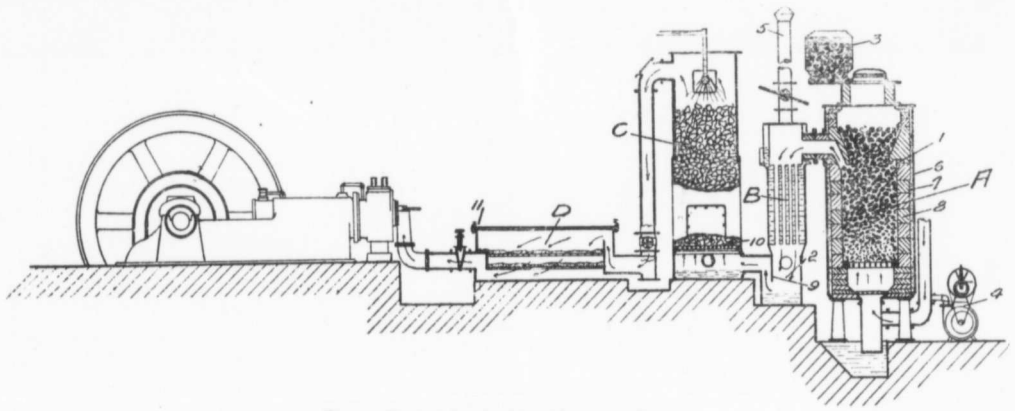

Fig. 1—Typical Suction Gas Plant and Engine.

When the engine is running the suction during the admission strokes of the engine draw a regulated mixture of air and steam up through the bed of incandescent fuel in the generator, A. Fig. 1, where the gas is formed. The gas collects in the annular ring, shown at 1, and passes on through the vaporizer B. Here the hot gas gives up part of its heat to the water, and steam is formed to be mixed with the air. From the vaporizer the gas is drawn into the scrubber or washer C, through the water seal shown at 2. The scrubber is filled with coke or some other substance which will answer the same purpose, over which water is continually sprinkl-

The Generator.*

The generator has the following three essential features, a mantle or covering made

lining, 8, is a layer of sand, asbestos or some other bad conductor of heat, so as to prevent as far as possible loss of heat due to external radiation. Sand, however, used for this purpose, does not give the best of results.

The refractory lining consists of fire bricks made from the best quality of refractory clay. This lining is built up with fire-bricks, instead of as a solid retort, so as to facilitate repairs. The fire-bricks are cemented together with refractory cement, which is also used to form a continuous cement surface on the inside of the retort. It is comparatively difficult to obtain fire-bricks suitable for lining generators; their quality depends very con-

* The two authorities for information on the detail parts of the suction plant are: "Suction Gas," by O. W. Haenvagen and "Gas Engines and Producer Gas Plants" by R. E. Mathot.