THE WREN GAS WORKS.

We illustrate herewith an improved system of manufacturing illuminating gas from crude petroleum, which is cheaper and of higher candle power than ordinary coal gas, and in the production of which apparatus which is both simple and easily managed is employed. Tests made in our presence showed that a 6 foot burner, consuming Brooklyn city gas, gave less light than either a 1-foot or $1\frac{3}{10}$-foot burner using the petroleum gas, pressures being the same in both instances.

The common objection to oil gas is that it does not come to the consumer in the shape of permanent gas. That is, the hydrocarbon is not fully gasified, but is rather in a semi-vaporous state; consequently the gas leaves a deposit in the pipes, and smokes when burned. In the present system this difficulty is claimed to be obviated by the construction of the retort used, which is divided by longitudinal partitions into chambers. The oil entering one of these is vaporized, and the vapor then passes through the retort from end to end four times in traversing the compartments. As a large sized retort enters six feet into the fire, it will be seen that the gas traverses 24 feet of heating surface, and in doing so it changes from vapor into a permanent gas.

The engravings given herewith exhibit plainly the arrangement of the apparatus. Fig. 1 shows the construction suitable for fixed works. Fig. 2 represents a portable arrangement. The crude petroleum is held in the receptacle, A, Fig. 2, and thence passes, by the pipe shown, into the inverted siphon, B, which communicates with one of the chambers of the retort which is imbedded in the furnace. It will be noticed that this construction effectually prevents any danger of explosion of the retort, because as soon as the stand pipe chokes, the pressure in the retort meets the entering oil and stops the inflow—the oil running over the funnel of the siphon. Consequently no more oil can get in and no more gas can be made until the excessive pressure is relieved. The stand pipe conducts the gas to an ordinary washing vat, C, and thence it goes to the receiver.

We are informed that such an apparatus as is exhibited in Fig. 1, the retort being 6 feet in the fire, 13 inches high, and 17 inches wide outside, will produce as much as ten large 9 feet gas retorts, or 40,000 cubic feet of gas per day of 24 hours. A No. 2 retort and bench complete, size 5 feet, 6x4 feet, and height 6 feet, is claimed to make the equivalent of 25,000 feet of coal gas per day, or sufficient to supply a village of from six to eight thousand inhabitants, the works being run continuously day and night. If more gas is required two or more retorts can be placed in the same bench, the labor and fuel used being no greater. To produce petroleum gas the equivalent in illuminating power of 25,000 feet of gas, using the single retort, the manufacturer states that 300 lbs. of coal will be consumed in the 24 hours' continuous run. So that the cost of making the gas will stand as follows:

50 gallons of petroleum, at 6 cents	$3.00
⅛ ton of coal at $8 per ton	2.00
Labor	4.00
Total	$9.00

This averages 36 cents per 1,000 feet of 80 candle gas. Actual practice has shown that over 4,000 feet of gas of the above candle power can be made from one barrel of crude petroleum which, even at the high rate of 10 cents per gallon, brings the cost of the gas to $7 for 4,000 feet. "This," says one user of the system, "gives a better light than $70 worth of coal gas at $3 per 1,000 feet."

We are further informed that the gas is unaffected by temperature, and that it retains all its properties over an indefinite period. It has been stored in a cylinder for four years, and at the end of that period it was foundto have leftno deposit and not to be impaired in its illuminating properties. It is well adapted for enriching coal gas of 11 candle or other low power. One part of petroleum gas to 5 parts coal gas makes a 17 candle light; 4 parts a 21½ candle light, and to 3 parts a 30 candle light. It is also suitable for heating purposes, and especially so for iron and steel working, owing to its freedom from sulphur.

The system is in use in Ashtabula, Ohio, where it supplies the town, the gas holder containing the equivalent of 50,000 feet of coal gas. Also in Shelbyville, Ind., Morris, Ill., and elsewhere, where its employment, we are informed, has proved uniformly successful.

Fig. 2.

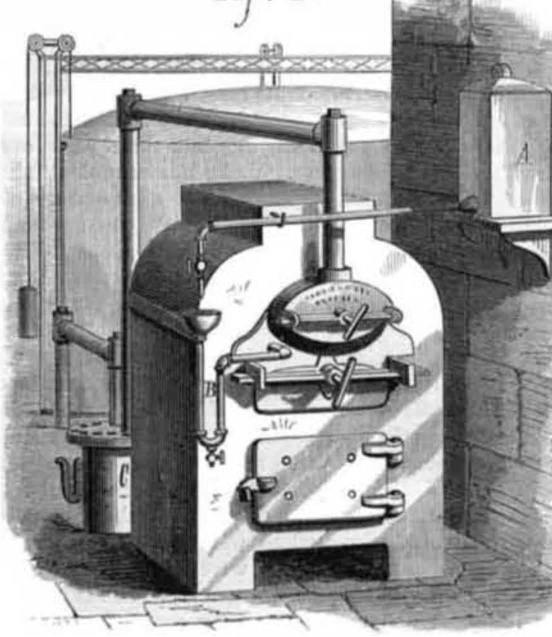

Fig. 2.—THE WREN PORTABLE GAS WORKS.

For further information address Dr. W. C. Wren, Wren's Gas Works, corner of Jay and Water streets, Brooklyn, N. Y.

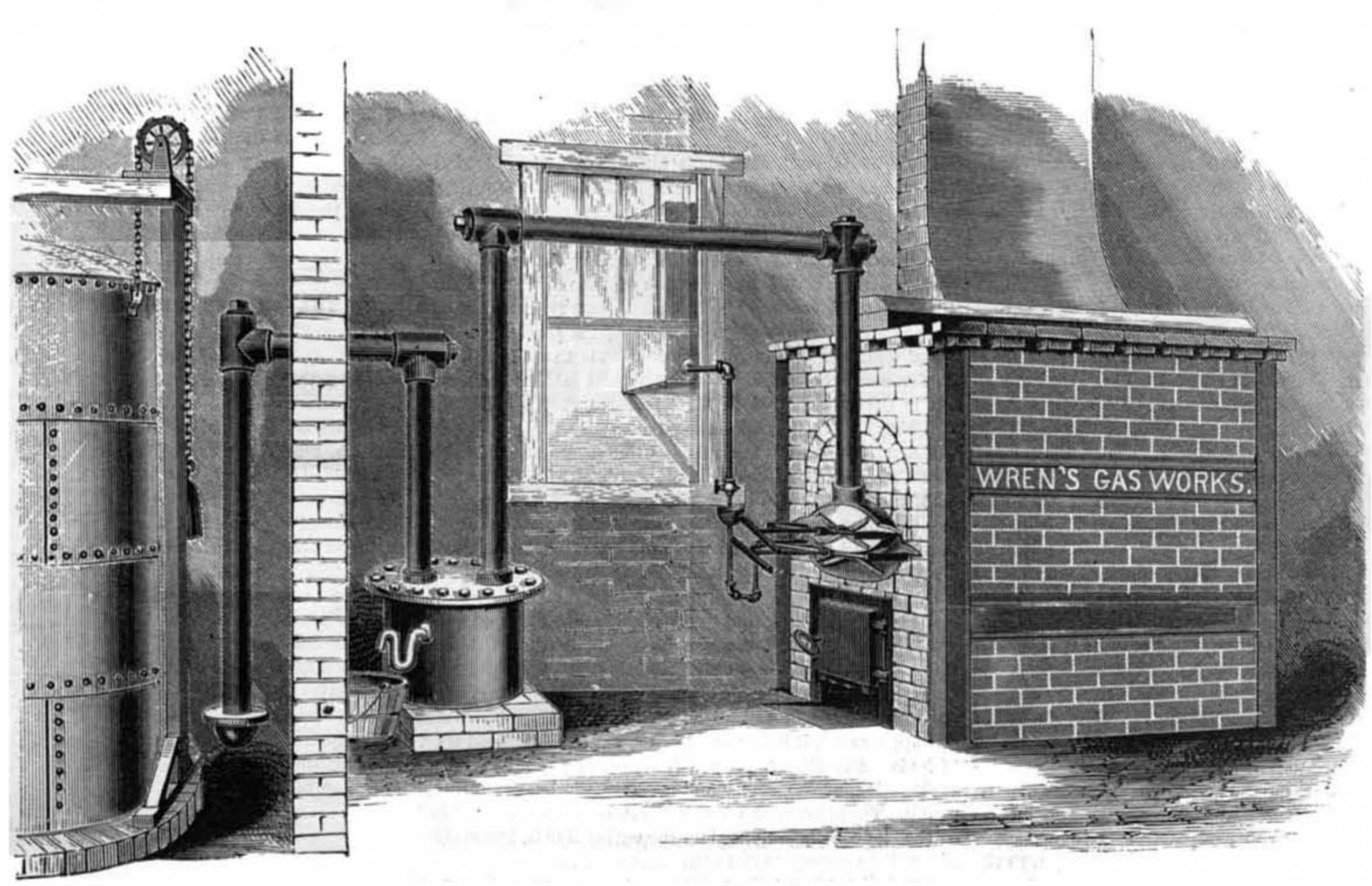

Fig. 1.—THE WREN GAS WORKS.

Analysis of Petroleum.

Anything in relation to petroleum is presumed to be interesting at the present time, and for this reason it may not be out of place to notice that the chemical constituents of rock oil are carbon and hydrogen, generally ninety parts carbon and ten parts hydrogen, by weight. The proportions form about an equal bulk, carbon being heavy while hydrogen is light and volatile. Originally, they both existed as gases, and by their union they form protocarburet of hydrogen, which, being condensed, forms naphtha, or light volatile oil; and after the escape of a portion of hydrogen, the product is petroleum. By a further escape of hydrogen, the product becomes more solid, as bitumen, pitch, or asphaltum, the higher stages of condensation being cannel, bituminous and anthracite coal. The diamond is the purest state of solidified carbon, and is probably a crystalization of carbonic acid gas, unadulterated with hydrogen. Coal oil is artificially produced by converging coal into gas, adding a proper equivalent of hydrogen and then condensing the gas. Iron, sulphuric acid, and water, when placed in contact, give off hydrogen gas. Burning charcoal gives off carbonic acid gas. Mix these gases in proper proportion, subject them to heat under confinement, then allow the heated gas to escape through water, and the condensation will produce carbon oil on the surface of the water, but it will cost about ten dollars a gallon, even if you get through without an explosion.—*Osceola Reveille.*

Columbia Water Works.

The Columbia, Ohio, water works, which are upon the Holly system, have now been in operation about seven years. Since they were built, the city has abandoned the use of their entire force of steam engines, and the losses by fire have been decreased from an average, previous to the introduction of the water supply, of 65-100 of one per cent to 9-100 of one per cent upon the total tax valuation, while since 1870 the valuation of taxable property has increased, in round numbers, from $16,000,000 to $27,000,000 in 1876. The average daily amount of water now being pumped is about 1,600,000 gallons, the machinery with which the works are supplied being capable of furnishing 10,000,000 gallons daily for domestic use or 7,000,000 gallons under fire pressure. There are now in use in the city upwards of 600 improved water meters, from the Eagle Meter Co., of Brooklyn, L. I., which are recommended by the engineer in his report as giving better satisfaction than any meter yet tested. Since their introduction three years ago, the consumption has but slightly increased, notwithstanding the growth of the city. There are about 45 miles of cast iron pipe laid, in connection with the works, which was furnished by H. R. Smith & Co., of Columbus, to the credit of which establishment it may be said that not a single length has thus far been obliged to be taken up from any faultiness of the pipe.

Fruit Bread.

Mr. Campbell Morfit, of Baltimore, Md., has recently patented a new method of preserving the juice of lemons, currants, oranges, and other fruits. He mixes the juice, with or without sugar, with any kind of cooked meal, makes the mass into cakes and bakes them. These cakes are afterwards ground up and used to make a very palatable fruit farina. The fruit juices are said to retain their original flavor and character indefinitely, and thus the fruit bread may become a valuable and convenient addition to the daily ration of sailors, and soldiers in the field.

The Utilizations of Slag.

The principal utilizations of blast furnace slag, nearly all of which, with the exception of the employment of the material as road metal, have come into use within the past four years, are summed up in a valuable paper recently read by Mr. Charles Wood before the Iron and Steel Institute.

Slag sand is employed for making concrete, building blocks, mortar, and cement. The cement is composed of slag sand with common lime and iron oxides, and its strength is said to be little inferior to that of Portland cement, while its price is not one fourth. Slag sand, with about 10 per cent of common slaked lime, makes a good mortar. Concrete is either made from slag sand or slag shingle. The latter is well suited for covering roads and foot paths. Slag wool, produced by the impact of a steam jet with a stream of molten slag, is used for covering steam boilers, steam pipes, ice houses, and cisterns, as a protection against fire, and as a filter for chemicals. Paving blocks and building bricks are made by pulverizing the solid slag and then pressing the bricks in a press.

A remarkable property of the bricks is that nails can be driven into them without causing their splitting. The bricks harden with age. Glass is produced of an impure quality by Mr. Bashley Britten's process, the molten slag being taken in a ladle from the blast furnace and poured into a Siemens furnace, where soda and silica are added according to the quality of the slag used.