

## THE NEW WATER-GAS PATENT.

The following is the specification of Professor J. Milton Sanders, of Cincinnati, issued on the 27th of July 1858, for making the new water-gas noticed in our columns two weeks ago, and regarding which some of our daily papers have been giving unreliable statements to the public:—

"To all whom it may concern: Be it known that I, J. Milton Sanders, of Cincinnati, Ohio, have invented a new and useful improvement in the manner of making illuminating gas; and I hereby declare that the following is a full, clear and exact description of the same, reference being had to the accompanying drawing, making a part of this specification, which drawing represents, in section, an apparatus by which the invention can be practically carried out.

"The nature of my invention consists in making an illuminating gas by passing the vapor of water and a hydro-carbon previously mixed into a retort containing carbon, and bringing said retort up to a high red heat, which produces the gas in question." [We omit the figure, as the apparatus is not claimed, and the invention is clearly explained, so as to be understood without it.]

"A vessel or boiler, made of sheet-iron or any other suitable metal or material, is used, and it may be furnished with two funnels, through which water and a hydro-carbon, such as coal-tar or spirits of turpentine, or benzole, may be passed or poured into said boiler. Heat is then applied to the boiler until the water vaporizes, and the mixed vapor of the water and hydro-carbon may be passed through the tube into the retort. It is not necessary that the hydro-carbon should be mixed with the water in the boiler, but it may be volatilized in a separate vessel; though I prefer the former process.

"The retort contains any form of carbon, such as charcoal, coke, anthracite coal; and the retort, with its contents, are brought up to a high red heat. The mixed vapors of water and hydro-carbon, in passing through and over the heated carbon, are decomposed—the water into its constituent gases. The carbon of the coal shares itself with the gases, converting the oxygen into carbonic oxyd, and the hydrogen into light carbureted hydrogen; at the same time, the hydro-carbon is decomposed, and a portion of its carbon converts the light carbureted ( $\text{CH}_2$ ) into heavy carbureted hydrogen ( $\text{CH}$ ) illuminating gas. There is likewise given out a trace of carbonic acid. I have said that any hydro-carbon will answer the purpose to mix with the water vapor; but I prefer those existing in large quantities in coal-tar, in consequence of their greater cheapness. If spirits of turpentine is used, then the following chemical equation will, according to my investigations, illustrate the re-actions:  $20 \text{HO} + (\text{C}_{10} \text{H}_8) + \text{C}_{38} = (\text{C}_{28} \text{H}_{28}) + 20 \text{CO}$ .

"By investigating the above, it will be perceived that 20 atoms of water, 1 atom of spirits of turpentine, and 38 atoms of carbon, are involved in the re-action, producing 28 atoms of heavy carbureted hydrogen ( $\text{CH}$ ) or illuminating gas, and 20 atoms of carbonic oxyd. The latter gas gives no illumination, but eliminates an intense heat, thereby causing the more intense ignition of the liberated carbon of the illuminating gas, and also rendering the illuminating gas the more valuable for culinary purposes, or for any purpose whereby heating by gas is required.

"The passing of water vapor over red-hot carbon has been done before by chemists, whereby they have obtained light carbureted hydrogen and carbonic oxyd, neither of which give any illumination. Some authors, however, say that they get the light carbureted hydrogen and carbonic acid; and therefore authors disagree in their statements of the results obtained from this process.

"I claim carrying the mixed vapors of water and a hydro-carbon, formed in the manner herein described, into a retort containing carbon at a high red heat, for the purpose of producing an illuminating gas.

"J. MILTON SANDERS."

The following is a letter of the patentee to the New York Tribune, of the 15th of October, on this topic:

"SIR:—In your issue of Saturday last, there is a communication relative to the cost and originality of my water-gas. I would, in reply to that article, simply say that the writer is in error. The late experiments in Philadelphia, together with many decisive ones made

elsewhere, have demonstrated beyond a doubt that, by the use of 25 pounds of rosin as a carbonizer, 1,000 cubic feet of gas can be produced, and which gives a brighter illumination than either rosin or coal-gas. By the use of a certain species of coal as a carbonizer, I have now reduced the cost of the gas to at least one-half that of the water-gas made from rosin. That the same results I have attained have been got in Europe is not true; for I have taken a course diametrically opposite those followed there, and therefore have reached entire success, while they have failed. It is simply absurd to assert that my process of producing water-gas has been accomplished in Europe; for, had that been the case, I certainly could not have obtained a patent in this country. My specification was six months before the Commissioner of Patents; and during that time the most rigid supervision was devoted to it. Had there been anything identical in it with any European patent, the able and experienced gentlemen who had the examination of the specification would certainly have discovered it. On the contrary, I have the written opinions of the ablest patent lawyers in this country, that my process for the production of the water-gas is entirely original, successful and invulnerable. In conclusion, I would state (in order to prevent further newspaper controversy) that the opportunity will soon be accorded the citizens of New York to witness the manufacture and illuminating qualities of the water-gas in the large way, when each person will have access to such facilities as will convince him that the water-gas can be made for considerable less than coal-gas, as it at present costs the New York, Philadelphia and Wilmington gas-works, and that it will give one-third more illumination.

"J. MILTON SANDERS."

The following is a letter from a correspondent, an able chemist, on this subject. It is partly in answer to our remarks on page 264. We present a review of the entire subject on another page:

"MESSRS. EDITORS:—Permit something to be said in your paper in defense of water-gas. If there is a particle of truth in the newspaper-stories of its cheapness and brilliancy, we ought to know it early, and assist in hurrying up the good time when we can turn night into day with little expense.

"Now the fact that the Patent Office has granted patents to both White and Sanders is pretty fair evidence that their processes are not substantially the same. If it be granted that White's process has proved a failure, is it a necessary *sequitur* that Sanders' should turn out the same? Both use the same materials—steam, charcoal and rosin, or bituminous coal; but they use them with this difference: White has his charcoal and steam in one retort, and his rosin or cannel coal in another; Sanders has all of these in one retort. White makes his water-gas and passes it into his retort, generating rosin or coal-gas; Sanders produces all the gases by the same fire, and in the same retort.

"Supposing all said in praise of Sanders' gas to be true, a chemist would reason thus: Sanders, by putting all his materials together, and under the action of the same heat, allows the elements to have play of affinity during the nascent state. Hydrogen, as a gas, will not unite with sulphur, phosphorus or carbon; but it is well known that hydrogen, at the point of divorce from other elements—at the point of change from the liquid or solid state to the gaseous—seizes upon the first two with avidity; and Sanders favors all the conditions of its seizing upon the carbon also. Sanders' gas is, then, by no means a mere mixture of water-gas and rosin or coal-gas—a dilution of real virtue, like our city milk; but it is a novel chemical formation. This theory may contain a fallacy or a flaw, but it certainly is not palpable.

"Facts are what are wanted—the results of actual trials; and here Sanders' gas is not without support. The gas was manufactured in Philadelphia on a large scale. Professor Mapes (not the Mapes connected with the "air-light" of the celebrated Rev. L. L. Hill) superintended the operations for several days, and gave an account of his observations in a printed report, which is favorable to the gas in every respect. Reckoning materials and labor, the professor tells us that the gas costs 37 cents per 1,000 feet, and is superior to the gas company's gas in its illuminating quality, in the ration of 53 to 47; and that, when some temporary inconveniences are removed, the gas will be produced still cheaper and better. I also have other evidence to the same point.

"I address you these things with the interest of a gas-consumer, and a lover of scientific and industrial progress; further than this interest, the subject is of no consequence to me.

C. A.

"New York, Oct. 27, 1859."

## NOTES ON FOREIGN INVENTIONS.

*Starch Sugar.*—The Abbe Moigno, of Paris, presents in *Cosmos* a statement in relation to the action of light, according to recent researches of Niepce de St. Victor. It is stated that if a solution of starch or dextrine is subjected to the action of solar light for a short period of time, it will be changed into glucose (grape sugar), the presence of which will be recognized by the ordinary reactions, and by its sweet taste.

*Recovering Wool from Fabrics.*—A patent has been taken out, in England, by R. Bell, for recovering wool from old worn-out clothes composed of cotton and wool, such as de-laines. The patentee takes muriate of manganese, such as is ordinarily obtained as a residuum in the manufacture of bleaching-powder; the rags to be treated are then steeped in a solution of this, which entirely decomposes the vegetable or cotton portions and leaves the woollen fibers uninjured. The liquor is then strained through a sieve that retains the wool, which is afterwards washed, dried, and may be used for shoddy or other purposes in making new goods out of old materials, just as new paper is made out of old rags.

*Restoring Faded Scarlet Colors.*—Next to deep indigo-blue, scarlet colors are perhaps the most expensive to produce on woollen fabrics, because cochineal, a very dear drug, is employed in the process. This color, although very showy, is very easily stained with iron rust, which makes it brown, or with an alkali, which changes it into a dingy crimson. To restore this color on fine woollen cloth, G. T. Bousfield, of London, has secured a patent for the following mixture:—Citric acid, 300 grains; carbonate of potash, 150 grains; water, 7,500 grains. The citric acid is to be dissolved separately in 4,500 grains of water, and the carbonate of potash in 3,000. The whole is then mixed together and applied with a sponge. A very dilute solution of the muriate of tin is a better mixture for this purpose than the citric acid and alkaline solution. After being applied, and the stain removed, the spot is washed with warm water. Red military coats and facings, which have become stained with iron rust from the musket, may be renewed in this manner.

*Air-engines.*—M. J. Laubereau, C. E., of Paris, has taken out a patent for a new air-engine. The machinery is arranged for producing the expansion and contraction of the air, and in causing the stroke of a piston to be effected by the expanded air, while the return of the piston is effected by the pressure of the atmosphere aided by a partial vacuum at the back of the piston. In this engine the air is heated in a cylinder by itself, like steam in a boiler, and the hot air is admitted to the working-cylinder, like steam in a high-pressure steam-engine. Cold water is employed at one end of the cylinder to produce a partial vacuum, and the heating-cylinder has a large pump for feeding the air to the working-cylinder. The water-cooling arrangement is a decided mis-improvement, but so far as it regards a separate heater, there is no disadvantage except an increase in size of the engine, from that of the small hot air-engine now in use in this country.

*Gas-burner.*—A new gas-burner has lately been brought out by J. Court, gas-fitter, London, which has received several commendatory notices by our scientific cotemporaries on the other side of the water. The improvement consists in forming a chamber in the nib, and filling it with perforated material, such as wire gauze. This retards the progress of the gas, and causes it to become more highly heated before it is ignited, thereby causing it to inflame sooner, and thus prevent any passing off unconsumed. A great number of patents have been issued, and much attention has been devoted to improvements in gas-burners during the past two years.

*A NEW SLEEPING AGENT.*—The *Abeille Medicale*, of Paris, gives the following sweet prescription for procuring sound sleep. It says:—"Put two or three pieces of sugar candy, of the size of a hazelnut, into your mouth, on going to bed, and before they are melted away, you will be asleep. The sleep caused by it is refreshing and invigorating, and not at all resembling that produced by any drug."