

v.42F, no.2-10

SMITH *ET AL.* V. PITTSBURGH GAS CO.

*Circuit Court, W. D. Pennsylvania.*

April 19, 1890.

1. PATENTS FOR INVENTIONS—EXTENT OF CLAIM—PRIOR STATE OF ART—ILLUMINATING GAS.

Letters patent No. 830,747, granted to Roland H. Smith on November 17, 1885, for a process of producing a fixed compound illuminating gas “by heating natural gas to a sufficient temperature to decompose and convert a fluid hydrocarbon into a fixed gas, and then bringing such hydrocarbon into contact with the heated natural gas,” in view of the prior state of the art of gas making and the proceedings in the patent-office, must be confined to a process in which the natural gas is first heated to the required degree, and the fluid hydrocarbon is then brought into contact with the natural gas thus heated.

2. SAME—INFRINGEMENT.

In the process practiced by the defendant, water gas hot from the generator, hydrocarbon oil and natural gas in its cold state, enter a sub or mixing chamber at

the same time, and, there intermingling, the gases and petroleum vapor pass up into a superheater, where they are subjected to a second heating, and combined fixedly. *Held*, that this is not an infringement of Smith's patent.

3. SAME—ANTICIPATION.

The patent granted to Asa W. Wilkinson on June 17, 1873, describes and covers a process for manufacturing an illuminating gas by taking "the natural light carbureted hydrogen gas escaping in some places from the earth," and, after purifying it in the usual way, passing the purified gas into and through retorts kept at or, near a cherry-red heat into which a rich hydrocarbon, such as petroleum, is introduced. *Held*, that Wilkinson's process was an anticipation of Smith's patent.

4. SAME.

Smith was also anticipated by the process practiced as early as the year 1878 at the Beaver Falls Gas-works.

In Equity.

*George Harding and D. F. Patterson*, for complainant.

*W. Bakewell & Sons*, for defendant.

ACHESON, J. The bill of complaint charges the defendant with the infringement of two letters patent granted to Roland H. Smith,—one dated November 17, 1885, and numbered 330,747, for a "process of producing illuminating gas;" and the other dated May 4, 1886, and numbered 341,354, issued upon an application made after the grant of the former patent, for a "process of manufacturing gas." But the witnesses on both sides agree that the two patents cover substantially the same process, and as this, undoubtedly, is the fact, in treating the case, attention need only be given to the specification and claim of the earlier patent, No. 330,747.

The declared object of the invention is to provide for the production of an illuminating gas "in conjunction with any suitable enriching agent, such as the various fluid hydrocarbons;" and it consists, the specification states, "in an improved process of producing illuminating gas by heating natural gas to a temperature sufficient to decompose fluid hydrocarbon, forming a fixed gas of any desired-illuminating standard." The apparatus shown and described consists of an ordinary bench of retorts, the several retorts being connected successively by a pipe extending from one to another. The first of the lower line of retorts is connected by a supply pipe with the natural gas main, while a pipe enters the top of the uppermost retort to supply it with the fluid hydrocarbon. The retorts being heated, the natural gas is admitted to the first retort, and thence is passed up, through the entire series of retorts until it reaches "the proper temperature to form a fixed gas with the fluid hydrocarbon subsequently admitted." The fluid hydrocarbon is so admitted into the uppermost retort, and from that retort an education pipe leads for the delivery of the resultant gas to the storage tanks, or to the point of consumption. The patent does not specify the degree, of heat necessary, nor indicate what the relative proportions of the natural gas and the fluid hydrocarbon should be, in the practice of the process. The claim of the patent is in these words:

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“The process herein described, of producing illuminating gas by heating natural gas to a sufficient temperature to decompose and convert a fluid hydrocarbon

into a fixed gas, and then bring such hydrocarbon into contact with the heated natural gas, whereby a fixed compound gas of suitable illuminating properties is produced, substantially as specified.”

The proofs show that before the date of Smith’s invention an apparatus; designated the “Granger Water-Gas Apparatus,” was publicly known and in use in the United States, whereby water gas is first produced in the usual way, and then, under the action of high heat, is enriched by the incorporation therewith of the gasified vapor of hydrocarbon oil, or petroleum, so as to form a highly illuminating gas. The apparatus, as described by the witnesses, consists of a tall, cylindrical superheater filled with brick checker-work, and having at its base a hollow mixing or subchamber, in the arched cover of which are numerous perforations leading into the superheater. An ordinary water-gas generator is connected with the subchamber by a flue, and directly opposite to the point of entrance of the flue an oil-supply pipe enters the chamber. In the operation of the apparatus the generator is charged with coke or anthracite coal, which is ignited, and by the use of an air-blast is carried up to a state of glowing heat; the products of combustion passing up through the superheater, and heating the checker-work to a cherry-red color. The blast is then cut off, and, the waste product outlet being closed, steam is admitted beneath the incandescent coke or coal, and, passing up through the same is converted into a water gas, consisting, as it leaves the bed of incandescent carbon, of free hydrogen gas and carbonic oxide gas in nearly equal parts. The water gas, in an intensely heated state, passing through the flue into the subchamber, there meets and mixes with the incoming oil, which, under strong pressure, enters the chamber in the form of a spray or mist, and the mingled gas and oil vapor pass up through the heated checker-work of the superheater; and the resultant illuminating gas passes thence through the hydraulic main and purifiers to the storage tanks.

Now, the defendant uses the old Granger apparatus and process, as above described, but with this addition, viz. The defendant has introduced a pipe for supplying natural gas to the subchamber; that pipe and the oil supply pipe approaching the chamber in converging lines, and their orifices being close together. When the superheater is blown up to a cherry-red color, the water gas in its heated state, the spray of the hydrocarbon oil, and the natural gas in its cold state, are admitted at the same time into the subchamber, and in their mingled condition the gases and oil vapor pass up through the superheater. The defendant has given evidence tending to show that nearly equal parts of water gas, petroleum gas, and natural gas enter into the composition of the resultant gas. It should here be mentioned that, in connection with the Granger plant, the defendant company manufactures by the old retort process common coal gas, which is mixed with the “Granger gas,” so called, in the purifiers and storage tanks, in the proportion of half of each in volume.

The position taken by the plaintiffs is that the defendant infringes the Smith patent in subjecting the natural gas and the liquid hydrocarbon

to the degree of heat stated, thus uniting them, and that it is immaterial that water gas also enters into the resulting fixed compound gas. The plaintiffs' expert witness, Mr. Coombs, speaking of the Smith patent, declares that "the gist of the invention is combining the natural gas and the hydrocarbon while they are in a heated condition;" and the plaintiffs' learned counsel contend that Smith's patent, No. 330,747, "covers the process of making a fixed compound gas by the union of gases resulting from the decomposition of petroleum with natural gas when heated to the degree required to decompose the petroleum, regardless of the mode or apparatus employed to heat and unite the gases, and regardless of the addition of non-illuminant water gas to dilute and expand the volume of the compound." But, in view of the prior state of the art of gas making, and the proceedings in the patent-office, I do not see how it is possible to give to the claim of the patent a construction so broad. It was a matter of common knowledge among gas manufacturers, long before the date of Smith's invention, that lean gases—that is, gases deficient in carbon—could be enriched, and their illuminating power increased, by combining with them, through the instrumentality of heat, the gases of decomposed hydrocarbons. The proofs here show several instances of the previous actual practice of such processes in several places in the United States, and a number of prior patents in evidence describe and cover such processes, and show suitable apparatus for the work. For example, the patent granted to Moses W. Kidder on June 12, 1877, shows a process for manufacturing illuminating gas consisting—*First*, in heating bituminous coal in a closed distilling chamber sufficiently to expel the hydrocarbon vapors from the coal without decomposing said vapors; and, *secondly*, in introducing a combustible non-luminant gas beneath the coal in skid chamber, and passing it upwardly through such heated coal, whereby the nascent hydrocarbon vapors are taken up and lifted out from the coal, and the non-luminant gas carbureted, the mixed gas and vapors being subsequently superheated, and thus permanently combined. Kidder's patent covers combustible non-luminant gases generally; but, by way of example, the specification, names water gas, hydrogen gas, carbonic oxide gas, and marsh gas. Now, there is a conflict of opinion between the witnesses in this case as to whether "marsh gas" and what is now known by the term "natural gas" are one and the same. But, if not absolutely identical, certainly the difference between them is so very slight that it may be safely affirmed that, as respects the process by which they may be carbureted, it is an unimportant difference. To the suggestion that, at the date of Kidder's patent, no analysis of natural gas, so far as appears, had been made to determine its elements, it can be answered that, at any rate, so soon as it came into use as a fuel and illuminant, it was known to belong to the class of lean gases.

But Mr. Smith was not the first to show to the public a process for combining fixedly, by the agency of heat, the gases of decomposed hydrocarbons and *natural* gas, *eo nomine*.

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The patent granted to Asa W. Wilkinson on June 17, 1873, distinctly sets forth a process for manufacturing an illuminating gas by taking “the natural light carbureted hydrogen

gas escaping in some places from the earth,” and, after purifying it, passing it through a retort or retorts, heated at or near a cherry red, into which petroleum or other rich hydrocarbon is introduced. The claim of the patent deserves to be here quoted at large.

“A process of manufacturing a rich and superior illuminating gas by first producing ordinary illuminating gas from bituminous coal, or taking the natural light carbureted hydrogen gas escaping in some places from the earth, then purifying the same by the usual process, and finally passing the purified gas through a retort or retorts kept at or near a cherry-red heat, into which a rich hydrocarbon, such as petroleum, naphtha, oils, resin, &c, is introduced, substantially in the manner set forth.”

The defendant cites Wilkinson’s patent as anticipatory of the Smith invention, and the point will be considered hereafter That patent is now referred to as illustrative, in part, of the prior state of the art; and, surely, it evinces, in connection with the other proofs under this head, that Smith’s patent cannot be construed so broadly as to cover every mode whereby a fixed compound illuminating gas is produced by combining natural gas with the gases of fluid hydrocarbon by means of heat.

Turning now to the proceedings in the patent office; we find that, in view of the several prior patents referred to by the examiner, Smith’s application was twice rejected. Upon the first rejection, in a written communication to the commissioner, Mr. Smith called particular attention to the fact that his invention “consists essentially in heating natural gas under pressure to a temperature sufficient to decompose a liquid hydrocarbon, and then decomposing such hydrocarbon by mixing with the heated fixed gas while under pressure.” And in a further written communication to the commissioner, upon the second rejection, after stating that in his case it was plainly set forth that “the temperature should be sufficient to decompose the admingled hydrocarbon so as to form a fixed gas,” Mr. Smith added this significant language:

“In other words, applicant employes the natural gas as a vehicle for conveying the necessary heat to the fluid hydrocarbon, to decompose it. This has not been even hinted at in any reference, and, as it forms an essential element of the present invention, it is submitted that the case should be allowed.”

Then, upon the examiner’s calling for “a full and fair acknowledgment of the state of the art as shown by the references, to distinguish between what is old and what is claimed as the improvement,” the specification was amended by inserting the following statement of the invention and disclaimer:

“My invention consists in an improved process of producing illuminating gas, by heating natural gas to a temperature sufficient to decompose fluid hydrocarbon, forming a fixed gas of any desired illuminating standard, as more fully hereinafter specified. \* \* \* I am aware that poor gas has been enriched by passing it directly from the retorts in which it is generated through liquid hydrocarbon, so as to take up the vapor of the same, and

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convert the mixed gases and vapor into a fixed gas by re-retorting; also, that natural gas has been, together with steam, passed through highly-heated carbon, the resultant



gases being combined with liquid hydrocarbon, and the mixed gases and, vapor converted into a fixed gas by subjecting the same to intense heat; and such processes do not claim.”

After this amendment, there was an allowance of the patent with the claim as herebefore quoted. Applying, then, to the Smith patent, the principles of construction laid down by the supreme court in the cases of *Union Metallic Cartridge Co. v. United States Cartridge Co.*, 112 U. S. 624, 5 Sup. Ct. Rep. 475; *Sargent v. Lock Co.*, 114 U. S. 63, 5 Sup. Ct. Rep. 1021; *Shepard v. Carrigan*, 116 U. S. 593, 6 Sup. Ct. Rep. 493; and *Sutter v. Robinson*, 119 U. S. 530, 7 Sup. Ct. Rep. 376,—a more limited effect must be given to the claim than the plaintiffs insist on. The above citations from Mr. Smith’s written communications to the commissioner, upon the faith of which the office acted, cannot now be excluded from consideration. They, in effect, restricted his application to, a process in which hydrocarbon is decomposed by means of heated natural gas, or, as he himself put the case, to a process which employs “the natural gas as a vehicle for conveying the necessary heat to the hydrocarbon, to decompose it.” And, when we read the claim in connection with the, amended specification, it is not difficult to see that it is so limited; for, as there defined, the patented process consists of two steps,—first, “heating natural gas” sufficiently “to decompose and convert a fluid hydrocarbon into a fixed gas,” and “then bringing such hydrocarbon into contact with the heated natural gas.” Now, it seems to me clear; that the defendant does not practice that process, for the natural gas enters the mixing or subchamber of the Granger apparatus at the defendant’s works in its natural, cold state, and, there intermingling with the heated water gas and the hydrocarbon oil, the gases and the petroleum vapor together pass into the superheater, and up through the heated brick checker-work.

If the foregoing views are correct, the defense of non-infringement must prevail, and hence this opinion might well here end. But the defense of anticipation has been fully argued by counsel, and it is perhaps better that the court pass directly upon it, also. The evidence to sustain this defense is the Wilkinson patent, already referred to, and proof by John M. Critchlow of the alleged prior use at the works of the Beaver Falls Gas Company in Beaver county, Pa. Comparing the Wilkinson and Smith patents, it is quite plain that the respective processes therein described are alike in purpose and in the apparatus employed; that in the practice of each the natural gas is heated, and the fluid hydrocarbon then brought into contact with it in its heated condition; and that the result in each case is the same. It is, however, here worthy of note that, while Smith does not mention any specific degree of heat, Wilkinson directs that the retorts be kept at or near a cherry-red heat, which the plaintiffs’ proofs show is the proper temperature. The only difference, then, between the two patents, is that Wilkinson provides for the purification of the natural gas by the usual process—that is, by passing it through lime purifiers—before heating the gas, whereas Smith says nothing about its purification. Doubtless Wilkinson supposed that

natural gas, like coal gas,—to which his patent also applies,—contains some impurity which should be eliminated; and in his specification he explains the advantage of purifying the gas, whether natural gas or coal gas be under treatment, before it enters the retorts. His language is this:

“The gas requires no purification after having left the last retort, and is now ready for the holder, thus avoiding the loss in illumination that rich gas suffers in passing through the purifiers.”

From this I think it is evident that Wilkinson did not regard the previous purification of the natural gas as at all necessary in order to carburet it. It might as well be argued that he supposed that the pre-purification of the coal gas was necessary before it could be enriched. In my judgment, his patent does not teach, or even intimate, that, in order to carburet natural gas, its purification is a prerequisite. Manifestly the prescribed purification is simply preliminary to the practice of the enriching process described in the patent, and here in question, and is no part of the process itself. Moreover, the uncontradicted evidence—coming, too, from the plaintiffs' expert—is that the purification of natural gas by the usual process does not in any wise change the nature of the gas, but simply removes any carbonic acid that may be present; and the witness says:

“It would leave it in a better condition to combine with the hydrocarbon by reason of the removal of the carbonic acid. Except by the removal of the carbonic acid, the gas would be the same.”

But, if previous purification puts the natural gas in a more suitable state for combining with, the fluid hydrocarbon, by what mode of reasoning can the conclusion be reached that the omission, by Smith of such purification involved invention? Again, can it be doubted that, had Wilkinson's process been later than Smith's, it would have infringed Smith's patent? But, if so, being earlier, it anticipated it. *Peters v. Manufacturing Co.*, 129 U. S. 530, 537, 9 Sup. Ct. Rep. 389.

The enrichment of natural gas, to increase its illuminating power, by mixing it, in a heated condition, with petroleum, was practiced at the works of the Beaver Falls Gas Company in the years 1877 and 1878; and the mode of operation is thus described by Mr. Critchlow, whose testimony is Uncontradicted, and may be accepted as truthful in its statements of fact. The natural gas, as it came from the earth, was conveyed in a pipe inserted through the lid of the mouth-piece of an ordinary retort, and delivered at the rear end of the retort, which was heated to the degree common in the distillation of coal,—say from 1,800 deg. to 2,100 deg. From the rear end of the retort the natural gas passed to the forward end, and thence upwardly through a vertical stand-pipe which connected the retort with the hydraulic main. The hydrocarbon oil for carbureting the natural gas was introduced into the stand-pipe, and, falling from the point of introduction, met and came in direct contact with the ascending hot natural gas, and “was thereby volatilized to a large

extent," and, mixing with the hot natural gas, was carried to the hydraulic main. That part of the oil which was hot immediately so affected by direct contact with the heated natural gas fell to the forward

end of the retort, and was there "more slowly volatilized" and mixed with the natural gas. The product of this operation was mingled with ordinary coal gas, and the admixture supplied to consumers. This process was practiced at the Beaver Falls Gas-Works, constantly, for the period of a year or more, and was then discontinued because the result was unsatisfactory; the compound gas, when any great quantity of oil was used, burning with a smoky flame, and the diminution of the quantity of oil producing gas of low candle power. Such being the facts, I do not see how it can be denied that the process so practiced at Beaver Falls was the same as that described in Smith's patent, and was an anticipation. What more does the patent disclose than was there known and pursued? As to the proper proportions in the admixture of the natural gas and the fluid hydrocarbon, the patent is silent. It gives no instruction whereby the excessive employment of the enriching agent may be avoided. Nor can the transaction at Beaver Falls be deemed an unsuccessful and abandoned experiment, within the meaning of the patent law. An illuminating compound gas was there actually produced, and for a long time was extensively used. The cessation of the use was not because the process was impracticable, but by reason of the unsatisfactory nature of the product, in that the compound gas burned with a smoky flame. And here it must be observed that there is testimony in the case tending very strongly to show that smokiness is a defect inherent in gas produced by combining natural gas and petroleum gas, for the reason that natural gas is deficient in hydrogen. I will not, however, discuss that subject. It is enough here to say that in my opinion the defense of anticipation is made out.

The defendant sets up other defenses, which have not been alluded to and will not be considered here, inasmuch as, for the reasons already given, the bill of complaint must be dismissed. Let a decree be drawn dismissing the bill, with costs.