

GUARANTEE TRUST & SAFE-DEPOSIT, CO. *ET AL.* V. NEW HAVEN GAS-LIGHT CO.

*Circuit Court, D. Connecticut.*

July 8, 1889.

PATENTS FOR INVENTIONS—NOVELTY—ILLUMINATING GAS PROCESS AND APPARATUS.

Letters patent No. 167,847, issued September 21, 1875, to Thaddeus S. C. Lowe, for an “improvement in process of and apparatus for the manufacture of illuminating or heating gas, contain a process for the manufacture of water-gas, containing but little nitrogen. The presence of nitrogen in illuminating gas is deleterious, and when it amounts to 9 per cent, or more, it amounts to a serious fault. The feature of the process consists in producing the gas in a close chamber,—that is, one from which the air is excluded,—or by an alternating, as distinguished from a continuous, process. All of the essential apparatus was old, except the fixing chamber, which is so arranged as to be heated internally by the products of combustion that escape from the generator and envelop the refractory material. *Held* that, as the invention introduced a very desirable advantage into the process of making illuminating gas, by which the expense is greatly lessened, the facts that the older inventions, which are now claimed to be susceptible of being modified by mere mechanical skill into the one in question, remained without modification until the patentee made it and that his improvement at once commended itself to those skilled in the art, are sufficient to show patentable invention.

In Equity. Bill for infringement of letters patent.

*B. F. Thurston* and *E. N. Dickerson Jr.*, for complainants.

*John R. Bennett*, for defendant.

WALLACE, J. This suit is founded upon the patent granted to Thaddeus S. C. Lowe, No. 167,847, dated September 21, 1875, for “improvement in process, of and apparatus for the manufacture of illuminating or heating gas.” The complainants allege infringement by the defendant of the first claim of the patent. That claim is as follows:

“(1) For the manufacture of illuminating and heating gas, the process of which consists of dropping or otherwise admitting in limited quantities, continuously or intermittently, hydrocarbon oils or other carbonaceous substances, liquid or solid, onto the top of, a thick mass of coal or other carbonaceous substance, in a state of incandescence, in a close chamber previously heated by direct internal combustion, with or without the introduction of steam, and then, for the purpose of superheating and fixing the gases of said chamber, passing them from said chamber into and through a second chamber, which also has been previously heated by direct internal combustion, substantially as set forth.”

This claim includes two inventions, each of which is a process in the sense that it involves the treatment of materials by successive steps conducted by means of a, combination of devices. Each process involves the use of apparatus which consists essentially of a cupola or generator, a superheater or fixing chamber having specified characteristics, and certain pipe connections for introducing air, or air and steam, into the generator, and carrying the gases generated there to the superheater. The superheater is filled with re-

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fractory material, such as loosely-laid firebrick, and is heated by the hot gases, which are produced in, the generator.

One process of the claim, and the process which it is: alleged is employed by the defendant, is for the manufacture of water-gas. This is an intermittent process. In this process, anthracite or bituminous coal, or other solid carbonaceous substances, are introduced into the generator and brought to a high state of incandescence by the passage through it of a current of air. The products of combustion which are there generated pass down through a pipe underneath the fixing chamber and then proceed upward through the fixing chamber, enveloping the refractory material therein by the aid of an air supply introduced at its base. When the carbonaceous matter in the generator has reached a high state of incandescence, the currents of air are discontinued, both at the generator and the fixing chamber, and steam is introduced at the base of the generator. The steam, acting upon the incandescent carbon, is decomposed, and a gas composed of hydrogen and carbonic oxide is evolved. At the upper part of the generator, or anywhere on the passage of this gas to the fixing chamber, a liquid hydrocarbon is introduced into it, and becoming volatilized passes with the other gaseous vapors through the pipe into the fixing chamber, where they are converted into permanent gas. After a time, the action of the steam upon the incandescent carbon in the cupola will have so lowered the temperature that the manufacture of gas cannot be successfully continued, and it becomes necessary to discontinue the current of steam, and to renew the supply of air, in order to again bring the carbon in the cupola to a high state of incandescence and heat up the contents of the fixing chamber. The gas made by this process consists of hydrogen, carbonic oxide, and a variety of hydrocarbon gases, and contains but little nitrogen. The presence of nitrogen in illuminating gas is deleterious, and when it reaches the extent of 9 per cent, becomes so objectionable as to be a serious fault. The feature of the process therefore, which consists in producing the gas in a close chamber,—that is, one from which the air is excluded,—or by an alternating, as distinguished from a continuous, process, is of controlling importance. The second process of the claim is one for producing an oil-gas. This process differs from the other in that no steam is introduced into the generator. This process is included in the claim, because the claim contains the words “with or without the introduction of steam.” This language has no sensible meaning unless it is intended to embody a process in the claim which is referred to in the specification as follows: “In case where gas extremely rich in carbon is desired, the same will be best produced by omitting the steam and generating the gas from oils alone, using the generator, *a*, either alone or in conjunction with the superheater.” It is not alleged that this process is employed by the defendant, and the question of the novelty of the process has not been referred to in the testimony of the expert witnesses. If it were void for want of novelty, it would be necessary for the complainants to file a disclaimer, and by doing so their right to recover for infringement of the other invention of the claim would not be affected, except as respects costs, *Tuck*

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v. *Bramhill*, 6 Blatchf. 95; *Taylor v. Archer*, 8 Blatchf. 315. As the point has not been made, and as it is

not charged that the defendant uses this process, this process does not require further consideration. It is plain upon the proofs that the defendant does employ the first process of the claim. The issue is upon its patentability. The gist of the invention in controversy consists in the use of a new apparatus for the treatment of the materials from which the gas is made. The same materials had previously been treated by the same series of steps, in the same order of succession, to produce a similar product. It was old to make illuminating water-gas by first producing a non-illuminous gas by the action of steam upon incandescent fuel, then adding to this gas hydrocarbons, and converting them into vapor or gas, and then passing this mixture through a fixing chamber; and apparatus of various kinds for performing these operations was old. All the essential apparatus of the patent was old, and had previously been used for carrying out these several steps, except the fixing chamber; and that differs only from previously used fixing chambers in that it is so constructed and arranged, in relation to the generator, that it is heated internally by the products of combustion that escape from the generator and envelop the refractory material, instead of being heated by an external fire. Under these circumstances, the novelty of the invention consists in the novelty of combining the fixing chamber of the patent with the other devices with which it is to be employed. It is plain, upon the proofs, that the patentee was the first to employ a fixing chamber in combination with the other parts, which enabled the products of combustion that escape from the generator during the operation of "blowing up" to fix or render permanently gaseous the mixture of hydrocarbonic oxide and hydrocarbon vapors produced in a close chamber.

A number of prior patents are relied upon by the defendant to defeat the novelty of such a combination. The case would have been much simplified, and the court relieved of much unnecessary labor, if all but two of these patents had been omitted from the record. The patent to Harkness of 1874 describes a process which is in all essentials the process and apparatus in controversy, except that the fixing chamber is a retort fired by external heat. The English patent to Siemens of 1864 describes apparatus for converting carbonaceous matter into combustible gases, and for their application to the heating or fusing of metals and other substances. The apparatus contains a superheater which is a chamber in which fire-bricks are loosely piled, to which the gas produced in the generator escapes, communicating heat which will be communicated to the next portion of gas which passes through the superheater. The gas made by this process contains 61 per cent, of nitrogen, and the superheater of the apparatus is not intended or used as a fixing chamber in the sense of that term as used in the complainants' patent. It is used to superheat a gas produced by combustion, on its way to a furnace where it is to be used in heating or fusing metals, etc. The other patents relied upon by the defendant are more remote from the invention than the Harkness patent. The patent to Arbos of 1863 describes apparatus in which the fixing chamber is heated externally, and the gas is made by

a continuous process in which air is constantly blown into a bed of coals. The British patent of 1868 to Benson & Valentine describes apparatus in which there are employed two distinct and separate fires. The first of these is a fire in which air is admitted at the bottom of the combustion chamber. The products of combustion are passed through a second fire, maintained by a separate current of air. The product of the first fire is a mixture of nitrogen, carbonic acid, carbonic oxide, and hydrocarbon gases and tarry matters. The object of the second fire is to destroy the tarry matters which are present. The process is a continuous one, and the gas made by it is not a practical gas for illuminating purposes, on account of the quantity of nitrogen which it inevitably contains, derived from the two fires supplied with air; and the products of the first fire are not passed through a second chamber which has been previously heated by direct internal combustion. The patent to Lowe of 1872 involves the use of a generator in which bituminous substances are maintained in a state of slow combustion by the action of currents of air. A distillation of the bituminous matter takes place above the fire, and the combustible gases result. These gases, mixed with the products of combustion, pass to a superheater which is heated externally. The process of this patent is an air process in which the fixing chamber is heated externally, and the product is a gas which is very rich in nitrogen. It suffices to say of the other patents which have been relied on in the argument for the defendant that the Blair patent describes an air process and an externally heated fixing chamber; and, in the apparatus of the Kirk-ham patent and of the Saunders patent, there is no fixing chamber. None of the patents, except the Harkness patent, describe inventions for making the product of the complainants' process. They were all directed to the production of gas differing essentially in the quantity of the nitrogen present, and involve the air process, or the continuous, as distinguished from the intermittent, process. But the process of the Harkness patent was directed to the production of the gas of the complainants' patent, made in a close chamber after the air has been excluded, and, as has been said, involves every essential step and detail of the process of the complainants' patent, except the use of a different fixing chamber. The patent-office rejected the claim now in controversy as void for want of novelty, until it was so amended as to limit it to a process in which the fixing chamber used was one "previously heated by direct internal combustion." Very plainly, the prior state of the art required this limitation to be made, in order to confine the claim to the real invention of the patentee. The novelty of the claim accordingly turns upon the question whether novelty is present or absent in the substitution of the fixing chamber described. If it did not involve invention to introduce such a fixing chamber in the apparatus of Harkness, there is no novelty in the invention claimed.

It cannot be safely affirmed that those skilled, in the art, having the Siemens patent before them, would derive any material assistance, from it in devising the fixing chamber

of the complainants' patent. The Siemens apparatus, is designed used in a process of gas-making in which

the gas has no hydrocarbon vapors to be broken up and fixed. Hydrocarbon gases and vapors are destroyed if exposed to a too high temperature; and the Siemens patent does not seem to offer a suggestion to assist an expert to ascertain that the superheater could be practically employed in treating hydrocarbon gases as they are required to be treated in the fixing chamber of the Harkness process, or the process of the complainants' patent. One of the experts for the complainants testifies, in substance, that the Siemens superheater was not designed to perform the functions of a fixing chamber; that "fixing" in gas-making is a term which is unquestionably limited to cracking up condensible hydrocarbon vapors into permanent hydrocarbon gases to effect a chemical decomposition, destroying one set of substances not suitable for illuminating gas, and creating another set of substances extremely valuable in illuminating gas; and that no such materials or products occur in the Siemens operation, and no such chemical changes result in the regenerating chamber of the Siemens apparatus. The patent is no more an anticipation of the present invention than the Harkness patent is. Any prior apparatus which would not produce the same results as the apparatus of the present invention cannot be substantially the same apparatus. The patent shows that a secondary chamber through which gas from a generator passes can be heated by placing refractory material within it to be enveloped by the gas. To this extent it is of some value, as showing the use of appliances, in principle like those of the complainants' patent, for a cognate purpose; and beyond this it is not valuable. The Harkness patent exhibits the present invention more nearly than does the Siemens patent, but the Harkness patent is not an anticipation of it, because the parts of the apparatus in combination do not operate in the same way to produce the same, results. Invention was not necessarily absent in making the substitution of the fixing chamber of the patent for the fixing chamber of Harkness because Siemens had previously used his device to superheat a different gas. It would have been absent if the Siemens device had been obviously adapted to supply the place of the externally heated fixing chamber in the Harkness apparatus. But the inquiry is whether the adaptability of the Siemens superheater to fix the gas of the Harkness patent was self-evident to the intelligence of those skilled in the art. If it had been, why was not the substitution made? It introduced very desirable advantages into the process of making illuminating water-gas. The experts on both sides concede that the fixing chamber of the patent can be heated more economically and more quickly than the fixing chambers which were previously used as in the Harkness apparatus, or in similar apparatus. If the making of this change had been an obvious thing, falling within this range of ordinary mechanical adaptation, it is probable that those skilled in the art would have sought to avail themselves of its advantages; yet, as appears by the prior patents in the record, the more expensive method of fixing the gas in retorts heated by external fires was everywhere followed. The various manufacturers in this country who were making



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gas according to the Tessie du Motay process, and using the externally fired retort, did not discover

what it is now asserted was an obvious thing. The fact that the older organizations which it is now claimed were susceptible of being modified by mere mechanical skill into the apparatus of the patent remained without any such modification until the patentee made it, and his improvement when made was so useful and valuable as to commend itself at once to those skilled in the art to which it relates, is sufficient to resolve any doubt whether the improvement embodies invention in favor of the patent. A decree is ordered for the complainants.