master can be corrected upon the coming in of his report upon exceptions properly taken.

There cannot be any question that the beginning of the suit should not be the limit of time within which damages may be recovered for the use of the patented device. They should be computed to the time, as nearly as may be, of the coming in of the master's report; and the account should embrace not only the damages sustained by infringing machines made before the institution of the suit, but also those made afterwards, though the construction be different. Rubber Co. v. Goodyear, 9 Wall. 788; Edison Electric Light Co. v. Westinghouse Electric & Manufacturing Co., 54 Fed. 504. Whether the particular machines of the defendant in this case embody any of the claims of the complainants' patent adjudged to be infringed by defendant is properly a question to be determined in the first instance by the master. As to the defendant's responsibility to answer in damages for the use of machines covered by or substantially like those adjudicated upon, the master is bound by the decree, and is not at liberty to take testimony or exercise his judgment; but, "if there is something claimed to be an infringement, which had not been passed upon by the decree, then the question concerning that would be open before the master to be passed upon by him." Wooster v. Thornton, 26 Fed. 274. He cannot review the decree, and inquire into the prior state of the art. The master in this case is limited in his inquiry as to whether the defendant's machines are substantially similar to those adjudged by the court to be an infringement of the complainants' patent. Upon this question of fact he should hear both the parties fully, and report his findings to the court. Upon the coming in of the report the parties can file their exceptions founded upon previous objections, and have the court pass upon their validity. It would be productive of interminable delay and much vexation if all the disputed questions upon a hearing before the master should, as they arise, be brought before the court for revision and approval. "The court may, but rarely will, interfere with the master's rulings before his report is brought before it for review." Fost. Fed. Prac. § 313. Reference to the court as each question arises is improper. Rob. Pat. § 1157; Sugar Refinery v. Mathiesson, 24 Fed. Cas. 682. The motion to strike out the testimony will not be allowed, and all matters pertaining to the merits will be deferred until the coming in of the master's report.

WELSBACH LIGHT CO. v. SUNLIGHT INCANDESCENT GAS LAMP CO.

(Circuit Court, S. D. New York. March 25, 1898.)

1. PATENTS—SPECIFICATIONS—EQUIVALENTS.
   A patentee is not obliged to state all the known equivalents of the materials used by him.

2. SAME—INFRINGEMENT.
   In a patent for the production of an incandescent mantle for lights, the patentee's claim was, "paraffin, or other suitable material, substantially as set forth." In his specifications he stated that "other materials may be

employed, as long as they set hard at ordinary temperatures, and burn away without mechanical destruction to the mantle." *Held*, that the patent was infringed by using for the same purpose collodion and castor oil.

3. SAME—INCANDESCENT MANTLES.

The Rawson patent, No. 407,963, for "production of incandescent mantles," was not anticipated, but covers an invention of pioneer rank, and is entitled to be so construed as to cover a broad range of equivalents.

This was a suit in equity by the Welsbach Light Company against the Sunlight Incandescent Gas Lamp Company for alleged infringement of a patent.

Wm. Findlay Brown and John R. Bennett, for complainant.
Charles G. Coe, for defendant.

TOWNSEND, District Judge. The questions herein presented at final hearing on bill and answer relate to the first claim of patent No. 407,963, granted July 30, 1889, to Frederick Lawrence Rawson and William Stepney Rawson for "production of incandescent mantles," and assigned to complainant. Prior to the discussion of the issues directly involved, it will be necessary to briefly describe the Welsbach light: In 1885, Dr. Carl Auer von Welsbach discovered or invented the mantle of the incandescent light which bears his name. Prior to that date it was known that certain rare earths, when heated to incandescence, were possessed of great luminosity. Dr. Auer von Welsbach (or, as he will hereafter be called, Welsbach) was the first to discover that by immersing a textile fabric in a solution of the salts of said rare earths, and afterwards applying heat and consuming the fabric, the earthy salts would be left in a coherent condition, exactly reproducing the fabric consumed, and capable of emitting the intense, white Welsbach incandescent light. Great as was this scientific discovery, it was commercially valueless. The resultant product was so light and fragile that although, as stated by the inventor, "it would remain effective as an illuminant for hundreds of hours," it would crumble to ashes if handled, or even touched by a hard body. In their specification, the patentees, after speaking of the difficulty previously found in transporting these mantles without breakage, say:

"This difficulty our invention is designed to overcome, by dipping the mantles, after they have been given their proper shape, into a liquid which will thoroughly penetrate the pores of the material, and will afterwards set to such a degree of hardness as to protect the material from danger of breakage in packing or handling, and which can afterwards be removed without mechanical injury to the mantles, or without leaving any objectionable residue."

The claim in suit is as follows:

"(1) The herein-described improvement in strengthening incandescent mantles, consisting in coating the completed mantle with paraffin, or other suitable material, substantially as set forth."

The defenses are invalidity for lack of invention, and denial of infringement.

Bright's British patent No. 12,305, granted in 1848, for "improvements in lamps, wicks, and covers for vessels for holding oil and other fluids," inter alia, describes a method of "manufacturing hollow, cylindrical wicks in a stiffened state," to permit of their easy insertion into

the lamp burner, "by inserting into them paper cases, * * * or by dipping them (not partially but wholly) in wax, or in any other suitable stiffening matter." It has not the same purpose nor mode of operation as the patent in suit, and does not anticipate it. Gwynne's patent, No. 52,788, issued in 1866, for an "improved process for saturating wood, cloth, paper, etc., with paraffin," and Toppan's patent, No. 89,095, for "improved water-repellant material," may be considered together. The patentee, Gwynne, says that, "when the paraffin is thus combined with the substances they seem together to form a new substance, inasmuch as it cannot be again expelled," and that substances thus saturated acquire "greatly increased tenacity, toughness, power of endurance and of resistance to the action of the elements." Toppan describes a similar treatment with a solution of paraffin. Each of these patents describes a process for making wood, paper, and cloth waterproof, by permanently combining them with paraffin. Neither of them attempts to effect the object of the Rawson patent. But defendant relies chiefly upon patent No. 261,529, issued July 25, 1882, to Charles Clamond, for "means and apparatus for producing intense white light." Fig. 9 of the drawings shows a burner composed of magnesian threads. These threads are made by forcing a wet, plastic material through dies. While thus wet they are shaped into the form of a cone, which is then dried and baked. The resultant product is a fragile, porcelain-like shell or basket of refractory material, capable of use with a gas burner to produce an incandescent light. In connection with this basket, the patentee used small rods formed of the same material. It was not claimed that there was anything novel in Clamond's magnesium light which is relevant herein. But defendant contends that "this patent shows that the strengthening of such fragile refractory cones, to protect them against breakage in transport and handling, was not new." This contention is founded upon the following statement in Clamond's specification: "The basket may be cased over with paper or other combustible material, so as to strengthen it for transport and handling; this casing being burned away when the jet is ignited." In this chief reliance of defendant I find nothing to detract from the merit of the patented invention. There was no strengthening treatment of a refractory material having the form of a textile fabric, no combination with another substance by saturation in a protecting solution, and no process of hardening the protecting solution. In short, Clamond merely proposed to wrap up his porcelain cone in a piece of paper, which would burn off when the cone was placed over a lighted flame. He protected his shell by an ordinary external wrapper, which could be removed in the ordinary way, leaving the shell as before. By the Rawson process, the solution so penetrated the interstices of the Welsbach fabric that it became an integral part thereof. But the expert and counsel for defendant claim that:

"All the Rawsons have done is to apply the old Gwynne process of dipping porous articles into hot, melted paraffin, or the Toppan process of dipping porous articles in paraffin solutions with a volatile hydrocarbon, such as benzine or naphtha, without any difference in their mode of application, or the result obtained therefrom, to the old purpose of protecting fragile mineral cones in transport and handling set forth by Clamond."

I cannot assent to this proposition. The Clamond protecting wrapper is not even remotely allied to the Rawson strengthening process. The result of the latter is new, distinct, and strikingly unexpected. To introduce these processes in this new art, and to work out and apply the undeveloped possibilities of this use of paraffin in solution in connection with these earths, so as to place this light within the reach of the general public, was a most meritorious invention.

Defendant says it does not infringe, because it does not coat its mantles with paraffin, or any of the equivalents mentioned in complainant's patent, and relies upon certain limitations claimed to be disclosed by the file wrapper. After describing the use of paraffin in the specification, it is there set forth that:

"Other materials may be employed, as long as they set hard at ordinary temperatures, and burn away without mechanical destruction to the mantle, and without leaving any residue which would injure the light-giving properties of the mantle."

The examiner required the patentee to insert a specific statement as to what other materials are used, and the following was thereupon added:

"The materials referred to as being capable of use in lieu of paraffin may be any solid hydrocarbon of a high boiling point, and many resins and gums soluble in spirit, such as alcohol, etc. Shellac will serve the same purpose, but not quite as advantageously."

The defendant insists that the patent cannot be infringed by the use of any materials other than those thus specified. It is admitted:

"That the defendant corporation herein has * * * and still is coating completed incandescent mantles or hoods, for the purpose of strengthening them for purposes of transport and handling, by dipping or immersing them in a solution composed chiefly of collodion, with the addition of a small percentage of castor oil, and in excess of five per cent.; that such solution is a liquid, which, after the mantle or hood is coated therewith by dipping or immersing said hood in such solution, will afterwards set at ordinary temperatures to such a degree of hardness as to strengthen the mantle or hood for the purpose of preventing breakage in transport and handling, and of such a character that it can afterwards be removed, by burning away, without mechanical destruction to the mantle, and without leaving any residue which would injure the light-giving properties of the mantle or hood."

Complainant contends that this collodion solution is included under the words, "paraffin, or other suitable material, substantially as set forth," in the first claim, notwithstanding the enumeration of equivalents in the patent. The invention of the patent in suit transformed the Welsbach mantle from a laboratory experiment into an article of commerce. That it has successfully overcome the obstacles previously encountered, and has accomplished results quite as important as the original Welsbach invention, is admitted. The evidence as to Welsbach's understanding of the limitations upon the practical use of his light, and the graphic illustration at the hearing herein of the bold and unique treatment of the fragile mantle, and the success of the adaptations employed in producing the desired results, indicate not only the presence of inventive genius, but claim for the invention the rank of a pioneer. For these reasons this patent should not be narrowly interpreted, but should be so construed as to cover a broad range of equivalents. The undisputed testimony of Drs. Chandler and

Morton shows that it was well known at the date of this invention that such a collodion solution would operate in the same way as a paraffin or shellac solution, in the treatment of such substances, and was therefore an "other suitable material." That in every other respect the defendant has appropriated the patented process, appears from his admission. While collodion is not chemically an equivalent of a hydrocarbon resin gum, and is not paraffin or shellac, it performs the same functions, in the same manner and with the same result. A patentee is not obliged, in his specification, to state all the known equivalents of the materials used by him. It is the patent as finally issued which the court is to construe, and upon which the patentee must stand. In this case the patentees have claimed "paraffin, or other suitable material, substantially as set forth." They have set forth that "other materials may be employed, as long as they set hard at ordinary temperatures, and burn away without mechanical destruction to the mantle." The defendant uses a suitable material, known at the date of the invention to have all these properties and characteristics, and has thereby appropriated complainant's product. Let a decree be entered for an injunction and an accounting.

PAUL BOYNTON CO. v. MORRIS CHUTE CO. et al.

(Circuit Court of Appeals, Third Circuit. April 7, 1898.)

No. 4.

1. PATENTS—INTERPRETATION OF CLAIM.
   Where it is necessary to construe an ambiguous claim, the specification may be resorted to for the purpose of arriving at a better understanding of its meaning, but this may not be done to ingraft on a perfectly plain claim a restrictive qualification, which the patentee omitted to "particularly point out."

2. SAME.
   The words "substantially as described" do not warrant reading into the claim, as an additional element, a device mentioned in the specifications merely as a preferred form of construction; and a patentee who has claimed either more or less than was necessary cannot, in a suit for infringement, be relieved from the consequences thereof.

3. SAME—SPRAY DEFLECTORS.
   When a boat so constructed that its sides will have the form of and operate as spray deflectors would not present patentable novelty, the objection is not overcome by fixing additional boards to it, and then using it as a toboggan as well as a boat.

4. SAME.
   The Newburg patent, No. 411,255, for an inclined pleasure railway located near a sheet of water, combined with a boat-shaped car or toboggan, adapted, after descending the incline, to enter and float forwardly on the water, and with spray deflectors fixed to its sides, is for mere structural changes of a toboggan car and boat, and did not involve invention. 82 Fed. 440, affirmed.

Appeal from the Circuit Court of the United States for the District of New Jersey.

This was a suit in equity by the Paul Boynton Company against the Morris Chute Company and others for alleged infringement of a patent for improvements in inclined pleasure railways. The circuit