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arranged at any desired distance from each other, I take this feature to be incidental to, and not a substantial change in, the principle; and generally, with respect to the changes relied on, they appear to me to be only additions of well-known agents of the same kind used in analogous cases with like effect.

I think, therefore, that the decision of the Commissioner was correct; and I do hereby affirm the same.

Z. C. Robbins, for appellant.

SAMUEL T. JONES, APPELLANT,

vs.

SAMUEL WETHERILL, APPELLEE. INTERFERENCE.

INTERFERENCE—PATENTABILITY—JURISDICTION.—Construing the sixth, seventh, and eighth sections of the act of 1836 together, it is clear that the interference referred to in the eighth section is an interference between patentable inventions. That is a preliminary question necessarily involved in the Commissioner's decision upon priority of invention, and may be considered by the judge upon appeal.

PROCESS—PATENTED MACHINERY.—It seems that the use of a new process, involving patented machinery, must be by the license or permission of the patentee or his assigns.

SM—TEST OF NOVELTY—IMPROVED RESULT.—In support of a claim for a new method or process, it must appear that the result produced is an improvement in the trade—using those words in a commercial sense, as meaning the manufacture of the article as good in quality and at a cheaper rate, or better in quality at the same rate, or with both of these consequences partially combined.

SM—SM.—In this class of cases the result is considered all-important. There must, however, be thereby evolved a principle such as will regularly, and not merely occasionally, in the use thereof, produce a like effect.

EVIDENCE—CAVEAT—EFFECT OF.—A caveat is admissible in evidence as part of the *res gestæ* in proof of the invention so far as it contains a description of the invention and the machinery which was then constructed.

UNSUCCESSFUL EXPERIMENTS—PROCESS.—Where the proofs offered by an inventor in support of his claim to have invented and discovered a new process—as of manufacturing white oxide of zinc—indicate that he did not in his

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experiments observe the proper chemical conditions—as the proper admixture of the ore and fuel, the depth of the charge, the regulation of the blast, &c.—and that as a matter of fact he failed to obtain successful results: *Held*, That his efforts amounted to no more than an unsuccessful experiment, and did not entitle him to a patent as against an independent inventor.

COPIES OF MEMORANDUMS AND LETTERS—EFFECT OF.—Records of memorandums and copies of letters cannot be considered as evidence *per se*. The originals might have been used to refresh the memory of the witness; but where it does not appear that this has been done, the copies cannot be used as confirmatory of the testimony of the witness.

SM—INCOMPLETE RECORDS.—Where the party presents copies of his memoranda, which are incomplete in important respects, it affords grounds for an unfavorable inference.

(Before MORSELL, J., District of Columbia, September, 1855.)

STATEMENT OF THE CASE.

The patent issued to Samuel Wetherill November 13th, 1855, No. 13,806.

MORSELL, J.

The subject of this case was brought before me on a former occasion—Burrows *v.* Wetherill (*ante*, p. 315)—when John E. Burrows was also a party; and the issue then was as to the right of invention of an improvement of the furnace by perforated grate-bars. On that appeal it was decided as between the two parties, Burrows and Wetherill, that Burrows must be considered the prior inventor of the improved perforated grate-bars in the furnace for the manufacture of the white oxide of zinc, as particularly described in his specification. I decided no point on the subject as between Burrows and Jones, there being no appeal as between them. I have had no sufficient reason since to be dissatisfied with the opinion.

Subsequently, on the 2d of October, 1854, an interference was declared between the appellant Jones and the appellee Wetherill in the matter of the process of making white oxide of zinc, in which the Commissioner says: "According to the views of the appellate judge, there is no conflict between Burrows and Wetherill in regard to the subject-matter of this second claim; but I think it clear that Jones claims this same process; so that between

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him and Wetherill there is a second interference, for reasons already set forth in a previous decision between the three contestants above named. I believe Wetherill to be fairly entitled to priority as the inventor of this process, and patent will issue accordingly, unless an appeal from this decision be taken previous to the first Monday of November next," &c.

On the appeal from which decision the appellant Jones duly filed his reasons. The first and second are general, because the Commissioner did not award priority of invention to appellants, and because his decision was contrary to the evidence in the case. The third and fourth rely on the caveat filed by Jones in 1848, on the written description in 1849 of his said discovery, and on the testimony applicable to said subjects, as substantially showing and proving appellant's invention of the process now claimed by the appellee to have been prior in point of time. The fifth and sixth are because the Commissioner decides that Jones was not successful in making white oxide of zinc, and because he had not carried his discovery so far as to be patentable. The seventh, because the Commissioner decides that the non-user by appellant of his discovery was an abandonment which affected his right to a patent.

This new issue appears to have been tried and decided upon the proofs and evidence in the former case alone, a statement of which, as far as it was deemed necessary for the points involved, was given in the opinion delivered on that occasion, and will not, therefore, be repeated now.

On due notice being given to the parties interested of the time and place appointed for the hearing of the appeal, the Commissioner produced and laid before me all the additional papers, with his opinion; the parties, by their counsel, respectively, filed their arguments in writing; and thereupon the case was submitted for my decision.

On the part of the appellee, it is contended that the only question before the judge on this appeal is which of the two parties, Samuel Wetherill or Samuel T. Jones, on the evidence submitted, is, in judgment of law and fact, the prior inventor of the process claimed under both applications; and that the jurisdiction of the judge cannot be extended to the consideration of the patentability of the invention of the parties.

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It is contended that that question cannot be considered as included in the decision of the Commissioner hereinbefore recited; that according to the construction of the seventh and eighth sections of the act of 1836, it ought not to have been; that according to the eleventh section of the act of March 3d, 1839, that point, therefore, cannot be considered as coming within the revision of the appellate judge. How is it as respects the fact? The Commissioner says (after stating that Wetherill is fairly entitled to priority as the inventor of the process): "And patent will issue accordingly, unless," &c. That he did act upon it, therefore, there can be no doubt. Ought he so to have done?

I cannot agree to the correctness of the construction given by the counsel for the appellee to the seventh and eighth sections of the act of 1836 in support of his position. I think the sixth, seventh, and eighth sections must be taken together in construction, from which it will appear clear that the nature of the interference alluded to in the eighth section is a patentable interference, and that it cannot exist before the Commissioner has satisfied himself by the examination as directed that there is *prima-facie* evidence (from the vouchers produced by the applicant) that all the conditions exist and all the previous requirements of the sixth and seventh sections have been fulfilled; and without such interference no question of priority of invention can arise in which is included the patentability of the invention. This idea is confirmed by that part of the eighth section which gives the right of appeal. After giving that right to either of the parties who shall be dissatisfied with the decision of the Commissioner on the question of priority of right of invention, on the like terms and conditions as are provided in the preceding section of the act, then it is said, "and the like proceedings shall be had to determine which, or whether either, of the applicants is entitled to receive a patent as prayed for." This being the view taken of the point, it will be seen that the decision of Judge Cranch in Pomeroy *v.* Connison, (*ante*, p. 40,) referred to, is entirely inapplicable. This preliminary objection is therefore not sustained.

The invention for which a patent is claimed in this case on the part of the appellant is for a process of making the white oxide of zinc by a mode or means of certain arrangements, in combination with the improved perforated grate-bars in the said furnace, for

the manufacture of the white oxide of zinc, as patented to John E. Burrows, No. 13,416, August 14th, 1855.

The issue embraces no claim by either of the parties to said patented invention, nor any improvement of the same, but is confined solely to the process. The use, therefore, in this connection must be by the license or permission of said patentee or his assigns. In order to constitute patentable novelty and utility, it must appear that the result produced by the combination was an improvement in the trade, and for the public good or advantage, by the manufacture either of a new article, or a better article, or a cheaper article to the public than that produced before by the old method. The terms "improvement in the trade," as used, applicable to the law of patents, should be considered in the commercial sense, and as meaning, of the article, as good in quality and at a cheaper rate, or better in quality at the same rate, or with both these consequences partially combined, leading to a cheaper production of the white oxide of zinc of as good or better quality. In this class of cases the result is considered all-important. There must, however, be thereby evolved a principle such as will regularly, not merely occasionally, in the use thereof produce a like effect.

These general remarks are made in this place to show the principles by which I shall be guided in the further investigation of this case. With respect to the character of the manufacture, both parties agree that a successful method or arrangement of means in the process will result in an improvement of the trade, by a great economy of fuel and in the expense required by the old mode in the constant renewal of vessels—the old method requiring a ton of coal to the one of ore, and the new mode only about six hundred pounds of coal to the ton of ore; and that the invention of the appellant, whatever it was, was long anterior to that of the appellee.

The appellant, to support his claim, offérs his caveat as evidence, amounting to a declaration of his invention, and as forming part of the *res gestæ*, to which point the third and fourth reasons are intended to apply. I can perceive no sufficient objection to the position, so far as it extends to the description of the invention and the machinery which was then constructed.

The caveat says: "For the improvements in the reduction of zinc ores, * * * for which purpose * * * I subject the crude

ores to the direct action of heat, either in a blast or draft furnace, along with the fuel, whereby the zinc is separated in the form of white oxide, sometimes called the flower of zinc, and which is to be collected in a chamber or prolonged flue connected with the furnace and with the chimney, wherein the flower will have time to settle, while the smoke and gasses pass off into the atmosphere," &c. It is admitted that Mr. Jones did not contemplate the use of the white oxide of zinc as a pigment, and that in some respects this was analogous to the arrangements in the furnace used for the smelting of iron, though substantially different in other respects.

With this the appellant connects the testimony of Major Farrington, his memorandum book, and sundry letters. As appellant states the testimony, it is that in the year 1848 Jones told him he believed he had made an important discovery; that his efforts had hitherto been to make metallic zinc directly from the ore; that he had succeeded as well as he expected, but found he could make the white oxide easily. He directed witness, after describing his plan, to make a quantity of white oxide, for the purpose of being reduced to metallic zinc. Witness adopted the plan suggested by him, and obtained white oxide of zinc. Occasionally alterations were made in the plan of working and collecting. He states then the plan—"working ore and fuel together"—and then describes the furnace. The furnace bottom was about twenty inches square, having an ash-pit about two feet deep. The body of the furnace was then carried about three to three and one-half feet above the grate, with a draft-hole or flue near the top, for the purpose of working the furnace described, and afterwards to collect the white oxide. Instead of covering the top of the furnace, a sheet-iron cap was adopted, connected with pipes leading to receivers. The chimney was very high and the draft very good. The principal alterations or modifications in the plan of working were more in the receiving apparatus than the furnace. The method of changing was first starting a fire in the furnace, placing on ore and fuel in alternate layers, till the furnace was nearly filled, the ore having first been brought to a uniform size, or nearly so, by breaking. The white oxide was obtained in small quantities. He formed an unfavorable opinion of the process in consequence of the difficulty of

collecting. He says the furnace put up by Mr. Jones at Newark after December, 1848, was carried about two and a-half to three feet above the grate-bars. At first an arch was turned over the top of the furnace, having a door or hole near the top to put in the charge; the ash-pit was closed, a blast introduced under the grates. The method of charging and working was similar to that described in Elm street. He is asked to state the difference, if any, in the two furnaces in the method of reducing the ore; to which he replies: "It was reduced more readily by blast than draft. I do not know that there was any other difference than that described in the reduction." In his answer to the thirtieth question, he describes an alteration in the grate-bars, to prevent the ore from falling through.

He is asked whether he made a record or memorandum of his experiments which he had described in Elm street and Newark. In answer, he says: "I made a record of every experiment tried and drawings of all the furnace apparatus." These memoranda were made in a small memorandum-book or on loose sheets of paper. But before the 1st of April, 1850, he copied the substance of them into a book, which book is in evidence, and marked Exhibit "A." In this book are to be found drawings of the furnaces; the last one used having a blast underneath the grate. From this record it will be seen that the difficulties encountered were in collecting. He says, in charging the furnace put up in Elm street: "We tried it at various heights—from five or six inches to two feet; they found a light charge to work the best; the thinner the fire, the better it worked; when crowded too much by piling in the ore the draught became obstructed."

On his cross-examination he says: "When the furnace was too heavily loaded, or the body of the furnace was too much filled up with ore and fuel, an invariable result was the finding of some part of the ore forming slag and obstructing the passage of air through the grate." They found the difficulty did not exist when working a very light charge.

In his answer to the one-hundred-and-tenth cross-question on the part of Burrows, he says: "After enjoining confidence as to what he (Mr. Jones) was about to communicate, Mr. Jones said: 'I think I have made an important discovery in experimenting to make metallic zinc; I have not succeeded in all respects as I would

wish to; the mechanical combinations of zinc and iron render it difficult of reduction in crucibles, as the iron will fuse and cut out the crucibles; but I have found that white oxide of zinc can be made, and believe a plan can be devised to collect it; and we all know that can be reduced very readily to metallic zinc, and probably in iron retorts. Now, the plan I propose is to work the ore when broken to a hickory-nut size, in the body of the furnace and in immediate contact with the fuel; the fuel itself will furnish sufficient carbon to deoxidize the ore, and probably sufficient oxygen will pass through the charge to oxidize the vapor of zinc; if not, atmospheric air can be admitted near the top of the furnace to oxidize the vapor of zinc. I propose placing a sheet-iron cap on the top of the furnace, connected with an elbow-pipe leading into a receiver, where I hope to collect it.'"

The letters of Mr. Farrington—one written to Mr. Jones, dated March 22d, 1849, and one to Mr. Curtis, dated March 29th, 1849—which are to be found annexed to the testimony of Mr. Duguid, are relied on to confirm the evidence given by him from recollection; said letters having been written before any controversy existed, and one, if not both of them, having the post-marks proving that they were written at the same time they bear date. In the letter of March 29th, 1849, written to S. T. Jones, Mr. Farrington says: "I put a barrel and a half of coke in the furnace, and, when thoroughly ignited, put on the sifted ferric ore, using one of our sheet-iron tubes as a charger, holding fifteen pounds. We can in this way scatter it well over the fire. When I left this evening we had been sub-liming zinc about two hours."

In the letter to Mr. Curtis of same date Mr. Farrington says: "I have this morning shipped a box of oxide by Stephens & Conduit's line, foot of Dey street. To-morrow I shall send more. The storm for two days has prevented my sending over, as well as interfering with our operations here."

Various grounds have been urged on the other side against the sufficiency of this proof; that it appears on scientific grounds that Jones never had a correct idea of the invention; that the process involves many chemical conditions, none of which can be departed from without total failure as a practical process. The first condition is the complete admixture of the pulverized ore and coal, in contradistinction to the charging of the furnace in alternate layers

of coal and ore, as practiced by Mr. Jones in his unsuccessful experiments. The second condition is the depth of charge three or four inches, instead of eighteen inches or two feet, tried by Mr. Jones. The third is the blast forced through the numerous small holes in the perforated bed of the furnace, each acting as a blow-pipe, in contradistinction to a general blast.

With respect to the reasons given for this theory, it will be proper to take some notice of the learned discussion between the counsel on the subject of the treatment of zinc oxide and carbonacious matters in a furnace to which a blast is attached. The counsel on the one side supposes the deoxidizing agent to be carbonic oxide; on the other side, carbonic acid. I have endeavored to inform myself on the subject from all the light I could derive from those arguments and from other sources, and from which it appears to me that the solution of the question cannot be very material as to the result, in the view I have taken of the point intended to be established; but I will briefly state my conception of it: Both sides agree to the ingredients necessary to be present in the furnace and the supply of air from below by the blast—all which must be gotten to a high heat, such as will be sufficient to votalilize metallic zinc. In that state carbonic acid, as such, could not exist; and if forced in, would be instantaneously resolved into carbonic oxide, by taking up more carbon. The oxygen of the air, therefore, on entering the burning mass, unites with carbon, forming carbonic oxide, and that of the zinc oxide also unites with another portion of carbon to form carbonic oxide gas, which gas escapes from the fuel-burning mass, with the zinc vapor, into the flue, and so passes off. In either case, therefore, it would be impossible for the gaseous products escaping through the burning mass of fuel and ore to be sufficient for the purpose of reoxidizing the zinc. Whilst it is escaping through the fire, or when it has risen above it into a flue or chamber, it must be reoxidized by the admission of air in some other way. And whether the charge of ore and coal be mixed intimately, as stated by the appellee, or arranged in layers of zinc ore, alternating with layers of pulverized coal, (if it be a light one,) I cannot perceive that there could be any material difference in the effect.

In the further consideration of this point, it will be proper to

consider the kind of furnace which it is contended was used, in combination with the process claimed by the appellant, as made out in the evidence. The grate was used; also one grate immediately above another; a perforated plate resting upon a grate and a bed with no perforations, and other similar forms of grate-bars; all of which, according to the theory I have adopted, are objectionable, because the proper quantity of air or oxygen, which ought to be the largest amount possible, never could be obtained with a sufficiently-perfect dissemination throughout the charge, which should be entirely free from all obstruction, as in the case of Burrows' furnace—the simple, finely-perforated bed or grate-bars alone, and unobstructed by other fixtures, admitting at once the proper quanty of air, and properly and effectually disseminating it when aided by the blast. Under any circumstances, the charge must be a light, well-regulated charge, to avoid unreasonable slagging, and to produce the pure white oxide of zinc, to make the invention patentable.

Major Farrington's testimony conflicts with this theory, the weight and effect of which will be next considered.

With respect to the record of memoranda, as it is called, and the letters, they certainly cannot be considered as evidence *per se*. The originals might have been used to refresh the memory of the witness, but this does not appear to have been the intent. They appear to have been used as confirmatory of the testimony of the witness, but according to the rule of evidence on the subject they were inadmissible for this purpose also. (See Ellicott *v.* Pearl, 10 Peters, 438, 439.) The omission, also, of the experiments at Newark as a part of the record, which would have shown the latest experiments, was a mutilation which affords ground for an unfavorable inference.

The substance, also, of the other part of Major Farrington's testimony has been stated. The weight and effect of this testimony, it is contended, is destroyed by inconsistencies and contradictions. Thus the witness says there was no difficulty in producing the white oxide of zinc by the plan pursued, and that it was produced in New York. If such was the case, is it reasonable to suppose that the same plan would not have been adopted at the Franklin furnace, New Jersey, where it had been experimented with for three months? But instead thereof the reverberatory process was

preferred, and that with the advice and approbation of both the witness and the appellant Jones. This inference, I think, is a fair and strong circumstance to show from the action of the parties themselves that the witness was under a delusion, and that they were satisfied that the appellant's plan was not according to the true and essential principle of the invention. The further objection is with respect to the box of metallic powder sent to H. H. Day. The witness says that some of the product, which he called the white oxide of zinc, made by the furnace of Jones (the appellant), was sold, boxed up by him, and sent to Day for the preparation of India-rubber. Day swears that the box so sent to him was not the white oxide of zinc, but blue powder; and Reiff proves that it was not only blue powder, but produced by the retort furnace, commenced by Hitz in April, 1849, and constructed first for making metallic zinc. In this it appears that the witness was incorrect in his statement both as to the character of the powder and the furnace from which it was sent. The witness Reiff also proves that the first white oxide of zinc ever produced in that establishment was in a retort furnace constructed by Hitz; and that it was a matter of such novelty and astonishment that S. T. Jones (the appellant) huzzahed at the results; and from what Farrington himself says, Hitz must have come there (into the establishment) with the approbation of the appellant; from which it is inferred that appellant must have become satisfied of his utter failure at this time.

It is further objected, as an inconsistency in the testimony of the witness, that after having fully described the furnace on the first day, giving minutely the dimensions, and, amongst others, the depth—two to two and one-half feet above the grate—on his examination the next day (and after conversations with others on the subject of his testimony) he is then asked, amongst other things, to state how the furnace was charged; to which he replied: "The method of charging was first starting a fire in the furnace, placing ore and fuel in alternate layers until the furnace was nearly filled," &c. He says: "While carrying it on, we sometimes charged two or three times a day." It is therefore probable that the slagging must have been unreasonably great.

The testimony of Bartlet and Keenan is relied on also to show additional contradictions and to destroy the credibility of the

witness Farrington. The testimony also of Richard Jones, which strongly tends to prove, by the admissions of appellant, his failure and abandonment of his experiments, is relied on by appellee. There is also other proof of the same kind urged by the appellee against the credibility of this testimony, which I do not think it necessary particularly to state.

According to the best judgment I have been able to form upon a deliberate consideration of the whole case, I am satisfied that the appellant was ignorant of an essential feature of the invention, and that he did not succeed in producing the white oxide of zinc according to a patentable sense thereof.

I do therefore decide that the decision of the Commissioner that the said appellant was not the prior inventor, and his refusal to grant letters-patent to said appellant Jones, was correct, and ought to be affirmed.

John L. Hayes, for the appellant.

GEORGE H. RUGG, APPELLANT,

vs.

JONATHAN HAINES, APPELLEE. INTERFERENCE.

PUBLIC USE FOR TWO YEARS—SECTION 7, ACT OF 1839.—Under the seventh section of the act of 1839 an inventor cannot obtain a patent if his invention was in public use more than two years prior to filing his application.

SM—ESTABLISHED BY TESTIMONY IN INTERFERENCE.—An applicant must be rejected upon testimony taken in an interference proceeding showing a sale and use of the invention more than two years prior to filing the application.

(Before MORSELL, J., District of Columbia, October, 1855.)

STATEMENT OF THE CASE.

Reissue application by Rugg filed February 22d, 1855; original patent No. 9,005, June 8th, 1852.

Reissue application by Haines; original patent No. 6,254,