

THE ADAPTATION OF MACHINERY TO PHOTOGRAPHY.

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In this age of steam, telegraphs, and photography, when the three most subtle agencies of nature—light, heat, and electricity—have been subdued by man and trained to do his bidding, startling developments and astounding applications in art and science are looked for as an almost daily programme in the great drama. Is it then to be wondered at, that the go-ahead Yankee, in his impatience at the slowness of this "fast" age, should conceive and actually carry out the idea of applying steam power to the production of photographs and should turn them out at a speed which eclipses the boasted rapidity of the "lightning" printing-press?

As an evidence that this may be and even has been accomplished, I have the pleasure of presenting for the inspection of the society, this evening, several specimens, among them a sheet containing about three hundred photographs all printed from one negative, at the rate of *twelve thousand an hour!* As astonishing as this speed may seem, I am assured, and from what I have seen, believe, that it may be greatly increased.

The means by which this is accomplished is, simply, the adaption of machinery to the process of printing by development. This process, though little used of late, has certainly produced some very fine specimens, and prints so produced are generally conceded to have the advantage in permanency over the ordinary prints produced by the direct action of light.

The machine is the invention of Mr. Charles Fontayne, of Cincinnati, Ohio, who has spent several years in perfecting it, and the developing process which he uses therewith. I am assured by him that the process by which these specimens were produced is quite different from any other known, but in what this difference consists I am not informed. A negative is fixed in a box, together with a sheet of prepared paper, and the latter exposed by automatic machinery to the condensed light of the sun passing through the negative. After each exposure the paper is traversed underneath the negative, to present a fresh surface for the succeeding impression. These motions, together with that of clamping the negative into close contact with the paper at the instant of exposure, are all performed by the operator simply turning a crank.

The rapidity, at the several times I witnessed its operation, was two hundred impressions per minute, at which speed the time of exposure was but .03 of a second for each impression. The condensing lens being seven inches in diameter, and the circle of condensed light about one and a half inches, the above exposure is equal to .65 of a second direct exposure to the light of the sun. If, therefore, the machine were to be used for a larger class of pictures, such as book illustrations and stereograms, a condensing lens might be dispensed with, and yet nearly twenty-five hundred impressions be taken in an hour.

This opens a field for photography hitherto impracticable in consequence of the time and expense of printing as ordinarily practiced. The illustrations for a book, having all the exquisite beauty and perfection of the photograph, may be turned out, by the use of this machine, with a rapidity wholly undreamed of, either in plate printing or lithography. The expense of engraving may be dispensed with, and the negative come direct from the artist's hands, drawn upon a prepared glass, from which, in the course of a few hours, the plates for a large edition may be printed, each one a perfect duplicate of the original drawing. As an evidence of the facility with which this may be done, a print produced by the ordinary ammonia-nitrate process, from a rough sketch so prepared, is herewith presented. It will be seen that an ease, freedom, and spirit is given to the drawing which cannot be equaled by any process of engraving, and when the negative is properly prepared by an experienced artist, nothing further could be desired for illustrating ideal subjects; but for the actual, and for reproducing the works of others, of course, the draughtsman would give way to the far more truthful camera.

But besides book illustrations and portraits for visiting cards, and advertising purposes, of which specimens are shown, this machine may be applied to the multiplication of stereograms, which, by its use, may be made so cheaply as to bring them into the humblest family,

where by their exquisite beauty and truthfulness they will engender a taste for the beautiful and, in time, entirely eradicate the cheap and disgustingly coarse lithographs, engravings, and water-color daubs, which at present form so large a proportion of the pictures within reach of the poor.

When these new adaptations of photography shall have been fully accomplished, then shall our noble art, which has already done more to develop and elevate the taste of the present generation than any other one instrumentality, take a stand by the side of its great sister art—Printing—and, hand in hand, will they go forth to educate, enoble, and elevate mankind.

The pictures herewith presented possess additional interest to this society, from the fact that they are taken upon ordinary American writing paper, which was not prepared specially for photographic purposes. Mr. Fontayne first used this paper in his experiments on account of its cheapness, and, having become accustomed to it, he now prefers it to any of the foreign photographic papers. In the course of his extended experiments, he has used almost every variety of American paper, including that made from straw, manilla and cane, with varying degrees of success, and he promises at some future time to present the result of these experiments to this society.

THE PROFITS OF THE ROCK OIL BUSINESS.

The artesian wells in the oil regions of Pennsylvania continue to yield their valuable product, and the sinking of new wells is being pushed forward with eagerness and rapidity. Thomas A. Gale, a resident on Oil Creek, has written a book on the subject, which has been published by Sloan & Griffith, of Erie, Pa. It furnishes the following facts in regard to the cost of digging and working the wells:—

The average cost of digging a well 200 feet deep is from \$600 to \$700. When there is oil enough to pay, a pump and steam engine to work it are wanted, with an oil vat and sheds to cover the whole. All this will make the outlay from \$1,000 to \$1,500. The cost of some wells, when ready for working, reaches \$2,000. A great margin is needed for what are called "accidents" and "bad luck," but what is, in reality, the result of inexperience in a new business. When a good paying well—a "10-barrel well"—is once ready for working, the expense is light. A very small steam engine requires about two cords of wood a day, and three "hands" are all that are necessary. The following is—

A Calculation for a Twenty-barrel Well.

Three men's wages.....	\$3 00
Two cords of wood.....	3 00
Twenty barrels.....	30 00
Caring to railroad.....	20 00
Freight to New York.....	9 00
Interest, repairs and sinking fund.....	75
Total.....	\$65 75
Amount of sales, at 40c. per gallon.....	\$320 00
Deduct cost.....	65 75
Daily profits.....	\$254 25

From a well of moderate pretensions, the oil can be raised, barreled and freighted to New York for about 12½ cents per gallon.

THE "LAST" MANUFACTORY AT RICHMOND.

A manufactory of lasts and boot-trees has lately been put in operation in Richmond, Va., being the first of the kind ever established there. The proprietors, Wortham & Co., get their persimmon logs from the Chickahominy Swamp, and some of them are of such a size as to yield 500 pairs of lasts. The Richmond *Enquirer* thus describes the manufactory:—"Outside the door of a frame building you will find two men with a cross-cut saw cutting great persimmon logs into lengths of from 12 to 16 inches; these lengths are transferred to the frame building, where they are split into chunks, and these chunks being hewn with an ax into a very rough outline of a last, are put into a drying kiln, out of which they come in ten days, hardened and ready for the lathe. The lathe is worked by steam, and consists of a frame about three feet high, two feet wide, and five or six feet long, and so constructed that one of the dried chunks, being put near one end of a horizontal axle, is shaped by a knife into a form exactly corresponding with a pattern last placed on the other end of the same axle. The chunk, thus shaped, is removed from the lathe; and the heel and the toe being trimmed, it is then filed, polished off, and the last is complete."

JUDICIAL DECISIONS IN THE GREAT SEWING MACHINE WAR.

The following are decisions rendered on a final hearing on pleadings and proofs in five sewing machine cases which were argued in June last, by George G. Sickles and C. A. Seward for the defendants, before Justice Nelson (Judge Smalley sitting with him), at Coopers-town, N. Y. The arguments occupied about two weeks, and the cases have since been held under advisement by the court. The testimony was very voluminous, amounting to nearly 2,000 pages in print. The opinions of the court contain all necessary particulars to enable the subject to be understood:—

UNITED STATES CIRCUIT COURT,
SOUTHERN DISTRICT OF NEW YORK.

1. *Orlando B. Potter and Nathaniel Wheeler vs. James G. Wilson and Alexander C. Stockmar.* 2. *The same vs. George B. Sloat and others.* 3. *The same vs. John B. Gibbs.*

(In Equity.)

Nelson, C. J.—[These suits are founded upon two re-issued patents to A. B. Wilson, for improvements in the feed-motion of a sewing machine. The original patent for the invention was granted 12th November, 1850. It was surrendered, and two re-issues, numbered 345 and 346, were allowed thereon, both bearing date 22d January, 1856; 345 was subsequently surrendered, and re-issued 9th December, 1856, numbered 414.

Previous to the invention of Wilson, as claimed by the plaintiffs, the material to be sewed had been advanced under the needle or sewing apparatus by the hand of the operator, or fixed permanently to a frame, called, in technical language, a "baster-plate," which was advanced with the cloth by a regular progressive motion to the needle through the agency of suitable machinery. By the former process (feeding by hand), the cloth could be turned at will, so that seams of any given curvature could be sewed; but there was no security for regularity of stitch, except the care and skill of the operator. By the latter, the regularity of stitch was attained; but, from the permanent attachment of the cloth to the baster-plate, a seam with curvatures and angles, at the will of the operator, as the sewing progressed, could not be formed. The object of the improvement in question was to remedy these defects, by causing the cloth to be moved automatically under the needle, and the device so arranged as to admit of seams of any curvature, and, at the same time, secure regularity of stitch. This Wilson accomplished by the machinery and process described in the specification of the patent.

Instead of the baster-plate, the cloth was advanced under the needle mechanically, according to the arrangement, by the joint action of two surfaces between which it was held, an intermittent motion being given to at least one of them, which caused the cloth to progress regularly, securing uniformity of stitch, and, at the same time, permitting the material to be turned by hand so as to sew a straight or curved seam.

The claims in the re-issued patents (numbered 346 and 414), which are in controversy in these suits, are all founded upon this feed improvement upon the previous sewing machines.

The utility of the improvement is admitted; indeed, it is apparent that, without it, or some equivalent which would admit of curved seams to be sewed automatically, the sewing machine, now in almost universal use, would have been comparatively very limited in its operation. It is insisted, however, that Wilson was not the first and original inventor, which objection raises the principal question in these cases.

The persons mainly relied upon—and, indeed, the only persons that can be relied upon, according to the proof, with any plausibility—to prove priority of invention, are Wm. H. Akins, of Ithica, and Leander W. Langdon, of Rochester, N. Y.

The proof is very full and satisfactory that the invention of Wilson was so far matured as to admit of sewing curved seams by way of experiment, as far back as 1848. In April, 1849, its peculiarities were noticed in the *Berkshire Cultivator*, published at Pittsfield, Mass.; and in November of that year, a more extended notice of it, with full lithographic prints, was given in the *SCIENTIFIC AMERICAN*, published in New York and Boston.

Akins himself has been examined as a witness in these cases upon the question of priority of his invention, and he does not carry its date further back than the latter part of the year 1850. He had made, previous to this examination, three affidavits on the subject, but in neither of these does he state that his improvement extended back to 1848; the farthest his affidavits carry its date is the Fall of 1849. And over and above this testimony, the clear and decided weight of the proof confirms the date he gives of the invention, when examined as a witness in the cases, namely, the Fall of 1850. One very decisive fact upon this question is not in dispute; and that is, that the first machine made by Akins after the partnership with Felt-housen (which commenced in August, 1850), had upon it the feed of the baster-plate, resembling that of the Lerow & Blodgett machine, which was exhibited in Ithica in the winters of 1849 and 1850.

The feed admitting of curved seams was introduced into the second machine made by him in the Fall of

1850, some two years after the date of Wilson's improvement, and which was even after the date of his patent. It is remarkable, if Akins had invented the feed improvement as early as 1848, which admitted the sewing of curved seams (an improvement so useful, and which has added so much to the value of the instrument), that some two years afterwards, when he commenced the business of manufacturing the machines, he should have omitted the use of it altogether.

There is another remarkable feature in this claim of Akins. A patent was issued to him and Felthousen jointly (August 5, 1851), as joint inventors, including this improvement. This was upon a model of the second machine made by him. It is agreed that these patentees first commenced business together in August, 1850, and that Felthousen had had no previous connection or interest in sewing machines, nor any knowledge of them. Both must have made oath that they were the joint inventors of the improvement before the patent could issue; and, if true as to Felthousen, the date of the invention must have been later than August, 1850. It is now pretended that Akins was the sole inventor of the improvement of the feed, which, if true, the Patent Office was imposed upon, as it could not properly have issued a patent to Akins and Felthousen, as joint inventors, for an improvement on the sewing machine by one of them. It is said that Akins was the inventor of the improvement in the feed, and Felthousen of the set screw above the needle-arm; if so, then separate patents ought to have issued to each for his own improvement, and not a joint patent to the two. If so issued, the patent is void. This action of Akins and Felthousen in procuring the patent, goes to confirm the view of Akins himself, in his testimony, that he did not invent the improvement until after the partnership with Felthousen, in August, 1850.

We forbear going over the proofs in detail upon this question of priority, and shall content ourselves by saying, after a very careful analysis and examination, the weight of evidence is all one way, and that is against the pretension set up in behalf of Akins.

In respect to the claim of Leander W. Langdon, his own account of his invention is as follows:—That when 13 years of age, and in the service of Daniel Rall, in Rochester, N. Y., some time in the year 1847, he read the description of a sewing machine in a newspaper, and observed, from the description, that the cloth was placed upon pins or sharp points, so that the curve of the seam could not be varied after the cloth was placed upon the pins, and that the idea then occurred to him of making a feed by which the curve of the seam could be varied; that after some weeks he had so far matured his thoughts as to make a feed model out of a shingle. No other parts of the machine were made. Nothing further was done in the way of perfecting his improvement or in adapting it to practical use, till the Fall of 1850, when he commenced the construction of a machine in the shop of a Mr. Wright, in Rochester. The shingle-feed model of 1847 was not preserved as of any value or importance at the time, and has been lost.

He claims that the machine made in Wright's shop in the fall of 1850, was a working machine, and embraced the feed motion devised in 1847. Langdon, in a subsequent examination, attempted to change the time of working upon the machine in Wright's shop, from the fall of 1850 to 1849.

It is quite clear, adopting the most favorable account of the invention of Langdon, as given by himself, that the proof falls short of overcoming the patents of Wilson, and the testimony upon which the originality and priority of his improvements rests. The proof fails as matter of law. "It is not enough to defeat a patent already issued that another conceived the possibility of affecting what the patentee has accomplished. To constitute a prior invention, the party alleged to have produced it must have proceeded so far as to have reduced his idea to practice, and embodied it in some distinct form. It must have been carried into practical operation, for he is entitled to a patent who, being an original inventor, has first perfected the invention and adapted it to practical use. Crude and imperfect experiments, equivocal in their results, and then given up for years, cannot be permitted to prevail against an original inventor who has perfected his improvement and obtained his patent." (1 *Blanchford*, 488, 494, *Parkhurst vs. Kinsman*.)

In this case, the pretended shingle model, containing the feed of a sewing machine, had no provision or arrangement for connecting it with or adapting it to the machine; it was laid aside for years and forgotten till after the improvement by Wilson was perfected, a patent granted, and the working machine had gone into general use.

But, independently of this ground, which we regard as conclusive upon the question, the proofs are overwhelming that Langdon's alleged improvement was long after that of Wilson, and even after the issuing of his patent of November 12, 1850.

Even the engine at Rall's, which he pretends to have been engaged in working when he read a description of the sewing machine in a newspaper, and made his shingle model of the feed in 1847, was not erected and put into operation until the spring or summer of 1848. And the clear weight of the evidence is, that he never worked upon a sewing machine till he went to work for Burroughs (in the Fall of 1851) who was engaged in manufacturing A. B. Wilson's machines, and did not commence making a machine for himself, till the Spring or summer of 1852.

Our conclusion is that, upon the whole of the proofs in all the cases, the clear weight of them supports the priority of A. B. Wilson's invention of the feed motion, and consequently the patents founded upon it.

Some objections have been taken in the defense, independently of the question upon the invention, which it is necessary briefly to notice:—

1. An objection that the proper parties, complainants, have not been joined in the suit.

This objection is founded upon the testimony of Orlando B. Potter, who was examined as a witness for the complainants. He states that the suits were commenced for the interest and benefit of the two companies represented by himself and Nathaniel Wheeler, viz.: the Wheeler & Wilson Manufacturing Company and the Grover & Baker Sewing Machine Company; that they have no interest in the suits, except as representatives of the two companies and stockholders therein; that the patents are held by them as trustees of those companies.

The proofs show that the legal title to the patents, and exclusive right to them in the State of New York, are in the complainants; and in a court of law they are the only parties proper to bring the suits.

It is urged, however, that in equity all parties must be joined who are interested in the subject-matter of the litigation.

In one sense, according to the testimony of Potter, these two companies may be said to be interested, but whether so or not, as to require them to be joined in the suit, is not certain. If they are but licensees under Potter and Wheeler, then their interest would not be such as would, in the sense of the law of patents, require them to be joined; and this is the relation they hold to the complainants, as insisted upon by their counsel.

This objection as to parties was not taken in the answer, nor do the proofs on either side seem to have been directed to the question. It has been raised for the first time at the hearing. An effort was made by the counsel for the defense to introduce evidence on the subject at the hearing, but the objection to its reception is too plain to call for any observations. If introduced before the Examiner, the attention of the opposite party would have been called to it, and an opportunity afforded for explanation. These objections, as to parties, are not favored when postponed to the final hearing upon the pleadings and proofs. (1 *Peters*, 299, 306. 13 *Id.* 375).

2. Objections have also been taken to some of the claims under the re-issued patents of January 22, 1856, Nos. 346 and 414.

The first claim in No. 346 is:—"The method of causing the cloth to be sewed to progress regularly by the joint action of the surfaces between which it is clamped, and which act in conjunction, substantially in the manner and for the purposes specified."

The second:—"Holding the cloth at rest by the needle or its equivalent, in combination with the method of causing it to progress regularly, substantially as set forth."

The third:—"Arranging the feeding surfaces, substantially as specified, in such relation to the needle that they, or one of them, shall perform the office of stripping the cloth from the needle as it rises or recedes from it."

The fourth:—"So mounting and attaching one of the feeding surfaces to some other part of the machine, that it may be removed or drawn away from the other surface at pleasure, as set forth."

Now, it is apparent that all the several claims rest upon and grow out of the main improvement in the feeding apparatus, consisting of the two surfaces clamping the cloth, and advancing it to the needle by the intermittent motion of one of them, and so arranged as, at the same time, to admit of the turning of the cloth, and sewing seams of any practically useful curvature. If this device is novel, and we have already shown that it was, then these dependent combinations and devices may well be maintained.

The same observations are applicable to the claim for a combination, embracing this feed improvement, in the patent numbered 414.

3. An objection is also taken that the defendant's machines do not infringe the improvement of the feed motion of Wilson.

The leading original idea of Wilson, and which he has embodied into his improvement, is the substitution of the two surfaces between which the cloth is clasped or held, for the baster-plate of previous machines, and so arranging these two surfaces that one of them, by an automatic intermittent motion of one or both, would advance the cloth to the needle, and at the same time admit of its being turned by the hand, so as to sew curved seams. Now, it is quite clear that this conception, which has remedied a great defect in previous machines, by getting rid of the frame upon which the cloth was fastened, and which could move only with the frame or baster-plate, and hence, practically, could sew straight seams and fixed curves only, was capable of being embodied into a working machine in various modes and forms. A skillful mechanic, by mere skill and without the use of the inventive faculties, could embody it and adapt it to practical use by different mechanical devices. This requires ingenuity, simply, not invention. But so long as Wilson's ideas are found in the construction and arrangement, no matter what may be its form or shape or appearance, the party using it is appropriating his invention and must be held an infringer; and

within this view we are satisfied the machines of the several defendants must be regarded violations of the patents in question.

Upon the whole, after the best consideration we have been able to give to these cases, we are satisfied that the complainants are entitled to a decree for the infringements and for injunctions, and reference to a Master to take an account.

UNITED STATES CIRCUIT COURT,
SOUTHERN DISTRICT OF NEW YORK }

1. *The Grover & Baker Sewing Machine Company vs. George B. Sloat and others.* 2. *The Same vs. John B. Gibbs.*

[In Equity.]

Nelson, C. J.—These suits are founded upon Letters Patent granted to W. P. N. Fitzgerald, dated 19th December, 1854, as assignee upon the invention and application of A. B. Wilson. The invention consists of an improvement of the feed motion of Wilson, embraced in his re-issued patents, Nos. 346, 414. The surface moving the cloth by its intermittent motion to the needle is caused to drop from the cloth in its return, to again seize it and advance for another stitch. The effect is to free the cloth from the surface in its return, with a view to again advance it.

The novelty of this improvement is disputed by the defendants.

The proof carries back this invention by Wilson (that is, his conception of the idea and embodiment into a model) to April or May, 1850; and it was introduced into a working machine as early as 1852.

The only improvement of the kind seriously claimed by the defense to be earlier than Wilson's, is that of Leander W. Langdon. We have had occasion to examine the claims of this person, generally as to the date of his invention of the feed motion in sewing machines, in a case between Potter & Wheeler against these parties, and to express our opinion on the subject.

In respect to this particular improvement, it is quite clear, upon the proofs, that Langdon never embodied it into a machine till after the year 1852, and after he had seen it in one of A. B. Wilson's machines.

Several objections have been taken in this suit by the counsel for the defendants, independently of the question upon the novelty of the invention.

1. It is insisted that the plaintiffs, by their charter in the State of Massachusetts, are incapable of using the invention in New York, inasmuch as the charter confines their operations to the city of Boston and county of Suffolk, in that State. But we do not so construe that charter. Although a Massachusetts corporation, the right to manufacture the machines is general and not confined to the limits of that State, and there is no prohibition upon it by the laws of New York. (13 *Peters*, 519.)

2. It is objected that the Wheeler & Wilson Manufacturing Company should have been made parties. This objection is founded upon a clause in the assignment of Fitzgerald, the patentee, to the plaintiffs, which is as follows: "subject, however, to an assignment this day made by me, the said Fitzgerald, of the right to use said invention, concurrently with the said Grover, Baker & Co., unto the Wheeler & Wilson Manufacturing Company, to which, for the terms therein, reference is made."

The answer to the objection is that the Wheeler & Wilson Manufacturing Company are only licensees according to the recital under the patent, and therefore have no interest capable of affording the foundation of a suit.

3. The next objection is, that the Fitzgerald patents recites that "the operative parts of this machine and its construction are substantially the same as those described in Letters Patent, bearing date 15th June, 1852, granted to N. Wheeler, A. B. Wilson, A. Warren and G. Woodruff." The defendants claimed the right, on the hearing, to produce the patent of the 15th June, 1852, and to show, from the recitals in it, that the improvement in question had been assigned by Wilson to the four persons above mentioned. Hence, that Wilson had only one-fourth of the invention at the time he assigned to Fitzgerald, and that he acquired only this interest, and could convey no greater interest to the plaintiff.

This objection was not taken in the answers of the defendants, nor was it the subject of examination or inquiry before the examiner.

As the patent of 1852 was not produced by the defendants before him, and the facts stated in the recital referred to and relied on then and there, the plaintiffs have had no opportunity for explanation; and even if the position of the counsel is well founded, it is impossible to so determine upon the proofs before us.

The objection comes too late, as well as the production of the patent of 1852.

4. It is further insisted that a device, described in a caveat filed by Wm. H. Johnson, November, 1848, and in a patent issued to him 7th March, 1854, contained the principle of this improvement of Wilson. But it is only necessary to read the description, and examine the model of this machine, to see that the device has no resemblance to that of Wilson in this improvement in question.

Without further pursuing the examination in these cases, we are satisfied that the plaintiffs are entitled to a decree for the infringement and for the injunctions, and reference to a Master to take an account.