

Of course not, if we disregard the office of the flexible joints, and the office of flexibly joining the discharge pipe to the dredge. But this office cannot be disregarded. It enables the action of the dredging machine to be continuous as it swings on a side feed and excavates. This is the essence of the invention, the new result which was not accomplished before, and bears the test of all the definitions of combinations to which I have been cited. The same remarks are applicable to the turntable or vertical anchors, whichever be used. Counsel say, "If any other holding is substituted for the turntable and spuds, the dredge does its work just the same." It would only do some work "just the same," and besides the turntable or spuds have other offices than "holding." It permits swinging as well,—work on a side feed, work on a forward feed. This is ignored by counsel.

The length of this opinion makes it impossible to consider at length the defenses of the abandonment of the invention or of the application. I think the evidence shows sufficient excuse for delay. For the same reason,—that is, it would make this opinion too long,—I have refrained from a detailed comparison of plaintiff's apparatus and devices with those which defendant asserts anticipate or limit them. Such a comparison, to be sufficient or satisfactory, would necessarily have to be very long.

I have assimilated claims 16 and 26 of patent No. 318,859; 13 and 14, 18 and 22, of patent No. 355,251,—and between claims 16 and 33 I find no patentable difference.

Decree will be entered holding infringement of claims 10, 16, 25, 53, 54, and 59 of patent No. 318,859, and 13, 17, and 18 of patent No. 355,251

SIMONDS MANUF'G CO. et al. v. E. C. ATKINS & CO.

(Circuit Court, D. Indiana. October 5, 1894.)

No. 8,667.

1. PATENTS—CONSTRUCTION OF CLAIMS—INFRINGEMENT—CROSS CUT SAWS.

The Simonds patent No. 269,728, for a cross-cut saw, as an article of manufacture, if valid at all, is limited to a saw formed by curvilinear grinding along lines parallel with its cutting edge, so as to be of substantially the same thickness throughout the length of its curved cutting edge, and of gradually diminishing thickness in the direction of its width from cutting edge to back; and the patent is not infringed by a saw having a curved cutting edge and straight back, and made from a plate of steel rolled so as to have a gradually diminishing thickness from cutting edge to back, and ground on straight lines, so that it has a slightly greater thickness along the central part of the cutting edge than at the ends, and a uniform thickness along the back from end to end.

2. SAME—PATENTABLE INVENTION—CHANGE IN SIZE.

It would seem that a patent for a special form of cross-cut saw as an article of manufacture cannot be sustained when it appears that there previously existed a small saw for cutting fire wood, of substantially the same form; for the change is one merely of size or proportion, which is not patentable.

This was a suit to obtain an injunction and damages for an alleged infringement of a patent.

Robert S. Taylor and Causten Browne, for complainants.

Chester Bradford, Wm. M. Eccles, and Augustus Lynch Mason, for defendant.

BAKER, District Judge. This is a suit in equity brought by the Simonds Manufacturing Company, a Massachusetts corporation, and George F. Simonds, a citizen of Massachusetts, against E. C. Atkins & Co., an Indiana corporation, to obtain an injunction and damages for an alleged infringement of letters patent 269,728, dated December 26, 1882, granted to George F. Simonds for an alleged improvement in cross-cut saws. The defenses interposed are noninfringement; that George F. Simonds is not the first or original inventor of the patented device; that the same, or substantially the same, device was in public use or on sale in the United States for more than two years prior to the application for such patent; that there is no invention exhibited in the patented device; that the patent was surreptitiously obtained by the failure to disclose the true state of the art; that the same, or substantially the same, device in all its essential features was long before known to and publicly used by various persons named in the answer; that the same, or substantially the same, device, as well as the method of constructing it, were shown or described in other patents of the United States, and in other printed publications set up in the answer; that the same saw, in all its essential features, which the defendant is now manufacturing, and which is complained of as the infringing saw, had been manufactured by the defendant and its predecessors for more than two years prior to the application for the Simonds patent; and that the arrangement and combination of parts and all the essential features of the patented device were known to and generally used by the public for more than two years before the application for the patent was made. The specifications forming part of the letters patent state that the invention has for its object the construction of a thin-backed cross-cut saw that shall cut an even kerf throughout its length, that shall not bind in its cut, and that shall be relatively thickened and strengthened towards the ends, whereby more lumber can be cut, and with less labor, than heretofore. The invention is stated to consist in a cross-cut saw of substantially uniform thickness throughout the length of its curved cutting edge, and of gradually diminishing thickness in the direction of its width from cutting edge to back. After describing the old cross-cut saws, and the various methods of grinding employed in their manufacture, the specifications proceed to state the method of grinding to be employed in making the cross-cut saw which the inventor claimed to have discovered, and which he desired to secure by letters patent, as follows:

"Instead of moving the saw plate to the action of the grindstone in a rectilinear path, I give it such movement as to cause every part of its curved cutting edge, throughout the entire length thereof, to pass successively through-

out the plane which is common to the axis of the presser bar and the grinding line at substantially the same point during any given passage, so that the lines of uniform thickness in the tapered plate are curves running substantially parallel to the general curvature of the cutting edge, because by keeping the cutting edge of the saw plate where it passes the grinding line at the same distance from the apex of the angle of inclination of the presser bar all other portions which pass through any given constant part of the angular space between the presser bar and the grinder, and which are consequently reduced to uniform thickness, will necessarily be acted upon at the same distance from the point at which the cutting edge is maintained, and will therefore be located in a curve which conforms to the curvature of the cutting edge."

The claim is single, and is as follows:

"What I claim as my invention is, as a new article of manufacture, a cross-cut saw of substantially uniform thickness throughout the length of its curved cutting edge, and of gradually diminishing thickness in the direction of its width from cutting edge to back."

In view of the prior state of the art as shown by the proofs, and especially in view of the admission of the complainants' expert, it is doubtful whether the patent in question is sustainable, because lacking in invention. Cross-cut saws, having a curved cutting edge, and thinner at the back than at the cutting edge, were well known and in common use long prior to the complainants' discovery. By the methods of straight or rectilinear grinding then practiced cross-cut saws were not made, and perhaps were incapable of successful manufacture, of such uniform thickness throughout the entire length of their curved cutting edge, and of such gradually diminishing thickness in the direction of their width from cutting edge to back, as are made by the grinding, as practiced by complainants, along curvilinear lines parallel with the cutting edge. The difference in form of the old cross-cut saw and of the saw claimed by complainants is necessarily slight, and the claim of the patent cannot be construed so broadly as to include the old forms of cross-cut saws. Therefore the claim, if sustainable at all, must cover a form of saw embraced within narrow limits of variation. Whether, within these narrow limits, it ought to be sustained, is not free from doubt, in view of the admission of complainants' expert that wood saws were previously known and in public use substantially the same as complainants' saw, viz. "a cross-cut saw [meaning wood saws] of substantially uniform thickness throughout the length of its curved cutting edge, and of gradually diminishing thickness,—i. e. tapered, from cutting edge to back." It is not necessary to determine whether or not the uncontradicted admission of their expert concludes the complainants, as seems to be held in *Wells v. Jacques*, 1 Ban. & A. 60, 75.¹ Complainants' expert endeavors to differentiate these wood saws from the saw described in and secured by the patent in question by the statements that "wood saws are saw blades intended to be used in a saw frame for cross-cutting comparatively small pieces of wood, such as ordinary fire wood," and that "they are used under wholly different conditions from the cross-cut saws of the Simonds patent,

¹ Fed. Cas. No. 17,398.

although some of them have a curved cutting edge of uniform thickness, and a substantially uniform taper from cutting edge to back," and that "they belong to a different class from the cross-cut saws, and are commonly ground by different machinery and different methods," so that the identity in form of the wood saws and the saw claimed in the Simonds patent would not suggest any way in which the same characteristics might be embodied in a cross-cut saw. The patent in question secures to the complainants their saw solely as an article of manufacture. It does not secure the methods employed in manufacturing it, nor the uses to which it may be devoted. The essential differences pointed out by the expert between the wood saws and the saw of complainants have relation to their relative size, uses, and methods of manufacture, which are features not covered by the patent.

Can a patent for a cross-cut saw, as an article of manufacture, be sustained when it is admitted that wood saws were old and well known in the arts, and were, in fact, cross-cut saws of substantially uniform thickness throughout the length of their curved cutting edge, and of gradually diminishing thickness from cutting edge to back? It is firmly established that mere change in size or proportion does not involve invention. This principle is declared and applied in the case of *Planing-Mach. Co. v. Keith*, 101 U. S. 479, 490. It is there said:

"It may be admitted it would be too weak for general planing work upon boards or plank. It is comparatively a small machine. It would not cease to be the same machine, in principle, if any one or all of its constituents were enlarged and strengthened, so that it might perform heavier work."

And it is further said:

"And it is not perceived why, if enlarged, it would not answer all the purposes of the Woodbury machine. Mere enlargement is not invention. The simplest mechanic can make such modification."

This doctrine has been applied in many other decisions of the supreme court. It has been held that changing the length and size of valve openings in the reed-board of an organ is not invention (*Estey v. Burdett*, 109 U. S. 633, 3 Sup. Ct. 531); that a change in the guide frame or rack of a cider press is not invention (*Pomace Holder Co. v. Ferguson*, 119 U. S. 335, 7 Sup. Ct. 382); that a change in the size of the ridge stone or cap stone and the corresponding width of the roof stones in roofs for vaults is not invention (*French v. Carter*, 137 U. S. 239, 11 Sup. Ct. 90); that a change only in form, proportions, or degree, doing substantially the same thing in the same way by substantially the same means, but with better results, is not invention (*Ansonia Brass & Copper Co. v. Electrical Supply Co.*, 144 U. S. 11, 12 Sup. Ct. 601). But conceding that the patent may be sustained notwithstanding complainants' saw differs from the old wood saws only in size, uses, and methods of manufacture, still the claim in question must be limited to a cross-cut saw of substantially uniform thickness throughout the length of its curved cutting edge, and of gradually diminishing thickness in the direction of its width from cutting edge to back. The claim itself does not,

by the general terms employed, conclusively determine the precise form of saw intended to be secured by the patent as an article of manufacture. But reading the claim—as we may—in connection with the specifications, no doubt, it seems to me, can be entertained in regard to the cross-cut saw which the patentee intended to secure, and which he has secured, if his discovery involved invention. It is a cross-cut saw formed by curvilinear grinding along lines parallel with its curved cutting edge, the saw so produced being of substantially uniform thickness throughout the length of its curved cutting edge, and of gradually diminishing thickness in the direction of its width from cutting edge to back. No other method of grinding than that pointed out in the specifications will produce with any degree of certainty or accuracy the form of saw which the patentee conceived he had discovered, and which he intended to secure by his patent. With this construction of the claim, it is conceded that defendant's saw is not an infringement. The defendant uses the old and well-known saw blade or plate of commerce in the manufacture of its saws. It consists of a blade or plate of steel having a curved cutting edge and a straight back, so rolled as to have a gradually diminishing thickness from cutting edge to back, and having a slightly greater thickness along the central part of the cutting edge than at the ends, and having a uniform thickness along the back from end to end. From such blades or plates the defendant manufactures the alleged infringing saws by first cleaning them without any change of form, and then by grinding them in straight or rectilinear lines, the grinding commencing at a part at the back of the blade or plate a few inches from one end, and continuing thence in a right line to a point within a few inches of the other end, and the contact of the grinder at each recurring passage over the blade or plate is shorter than the preceding one. The blade or plate is thus passed under the grinder up to a point within about two inches of the curved cutting edge, thereby producing what is called by the defendant its "segmentally ground saw." The saw thus manufactured, except where thus segmentally ground, retains the exact form of the original blade or plate of commerce, except for such slight and immaterial change as may be caused by polishing. In my opinion, the saw of the defendant, thus made, is not an infringement of the patent in question, even if valid, and the bill will therefore be dismissed for want of equity, at the costs of the complainants.

WESTINGHOUSE et al. v. EDISON ELECTRIC LIGHT CO.

(Circuit Court of Appeals, Third Circuit. September 11, 1894.)

No. 7.

1. PATENTS—LIMITATION OF CLAIMS—"SUBSTANTIALLY AS SET FORTH."

Matters which are only incidentally referred to in the specifications, and not described, cannot be read into the claims by means of the words "substantially as set forth," especially when the claims themselves are unambiguous and exact.

2. SAME—COMBINATION CLAIMS—SEPARATE ELEMENTS.

A claim for a combination carries with it an implication that the separate elements are old. The Corn-Planter Patent, 23 Wall. 181, followed.

3. SAME—PATENTABLE INVENTION—PRIOR ART—ELECTRIC LIGHTING CIRCUITS.

The Edison patent, No. 264,642, for preventing the drop in tension upon electric light wires by combining a feeding circuit with a consumption circuit, the main conductors of which are so proportioned as to maintain such uniformity of pressure upon them that there is practically no variance in the candle power of the lamps connected therewith, is void as to the first three claims, as showing merely the application of mechanical and engineering skill to solve the difficulty as soon as it was made to appear by the production of a practicable incandescent electric lamp. The lack of invention is especially apparent in view of the prior state of the art as shown by the French patent to Khotinsky, of 1875. 55 Fed. 490, reversed.

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

This was a bill in equity brought by the Edison Electric Light Company against Westinghouse, Church, Kerr & Co. "to restrain the infringement of the Edison patent for an electric distribution and translation system." The circuit court sustained the patent and rendered a decree for complainant (55 Fed. 490), and defendants appealed.

Leonard E. Curtis and Edmund Wetmore, for appellants.

Frederic H. Betts, for appellee.

Before ACHESON and DALLAS, Circuit Judges, and BUTLER, District Judge.

ACHESON, Circuit Judge. This suit was for the alleged infringement by the defendant of letters patent of the United States to Thomas A. Edison, No. 264,642, dated September 19, 1882, granted upon an application filed August 9, 1880, for an "electric distribution and translation system." After stating that the "invention relates to a method of equalizing the tension or pressure of the current through an entire system of electric lighting, or other translation of electric force, preventing what is ordinarily known as a 'drop' in those portions of the system the more remote from the central station," the specification proceeds thus:

"As is well known from patents already granted me, and prior applications pending, I use in my system an electric light formed of a continuous incandescing conductor, large numbers of which are grouped into one system, supplied and regulated from a central station; main conductors leading from and to the central station; each lamp or translating device being in a derived circuit to the main conductors; the entire system being what is known as a 'multiple-arc' system. From a central station the main conductors may proceed, and it is intended that they should, to a great distance, and supply a large number of translating devices. In such cases there is inevitably a difference in tension between various parts of the circuit, due to the resistance of the main conductors. This may be partially remedied by making the conductors very large near or at the station, gradually decreasing their size or conducting capacity, but such plan only lessens slightly the ratio of fall. To obviate the difficulty I provide feeding conductors which extend from the generator or generators to the main conductors of the lamp or consumption circuit or circuits; such feeding conductors not having any translating devices connected therewith, and being connected with the main conductors of the consumption circuit or circuits at the center, ends, or other

points on such main conductors. From a central station several sets of such feeding conductors may run; each set feeding into its own lamp or consumption circuit, or all the sets feeding into a connected system of lamp or consumption circuits. It will be seen that the drop upon the feeding conductors has no effect upon the relative candle power of the lamps of the system, the relative candle power of the lamps being affected only by the drop upon the main conductors of the consumption circuit or circuits between the end of a set of feeding conductors and points most distant from any feeding conductors. In order to maintain practically the same candle power throughout the system, the main conductors of the consumption circuit or circuits should be so proportioned that the drop in tension upon them shall not exceed a definite small limit,—for example, five per cent. This drop will make a difference of less than a candle power in all the sixteen candle power lamps of the system, which difference is not perceptible to the eye. Upon the feeding conductors, however, any loss can be made. This loss will be varied according to localities, and the relative cost of copper for conducting purposes and horse power for generation. This loss upon the feeding conductors in large and extended systems will generally be greater than upon the main conductors of the consumption circuit or circuits. It may be, for example, about fifteen per cent.; but circumstances might make it desirable to diminish the loss upon the feeding conductors down even as low as that upon the main conductors of the consumption circuit or circuits, or to increase the loss upon the feeders to more than fifteen per cent. * * * When it is desired to use a few lamps near the central station they may be placed upon a direct circuit therefrom, with resistance at the commencement or home end of the circuit sufficient to then reduce the tension of the current in such circuit so that it shall only be equal to that in the more distant circuits, and one or more of such circuits may be combined with the circuits before described. When large buildings or blocks of buildings, using many lamps, are to be supplied, it may be desirable to lay therefor separate feeders, insulated from each other. Where several central stations are used in a city, each having feeding conductors leading to lamp-circuit conductors of the description before noted, it may be advisable to connect the feeding circuits of all the stations, equalizing the tension or pressure throughout the entire system of the place where the central stations are located."

The illustrative drawings show different applications of the general form of circuit described in the specification. The patent has six claims, but the defendant was charged only with the infringement of the first, second, and third claims, which are as follows:

"(1) A consumption circuit, in the main conductors of which the drop in tension is not sufficient to vary practically the candle power of the lamps connected therewith, in combination with feeding conductors connecting the consumption circuit with the source of electrical energy, and having no translating devices connected therewith, the drop in tension upon such feeding conductors not affecting the relative candle power of the lamps of the consumption circuit, substantially as set forth. (2) A consumption circuit, in the main conductors of which there is, a definite, small drop in tension, not sufficient to vary practically the candle power of the lamps connected therewith, in combination with feeding conductors connecting the consumption circuit with the source of electrical energy, and having no translating devices connected therewith, the loss upon such feeding conductors being greater than upon the main conductors of the consumption circuit, substantially as set forth. (3) The combination of a consumption circuit, in the main conductors of which the drop in tension is not sufficient to vary practically the candle power of the lamps connected therewith, with a feeding circuit having no translating devices, and extending from the source of electrical energy to the center of the consumption circuit, substantially as set forth."

For the proper determination of this case it is essential that the subject-matter of these claims should be clearly understood.

This patent does not deal with the complicated general problem of the distribution of electricity, and the subdivision of the current for the purpose of domestic illumination. The patent is not for an incandescent lamp, or for a dynamo for generating electricity, or for the arrangement of the lamps in multiple arc, or for indicating and regulating devices for controlling the current from a central station, singly or combined. The patent deals with the one particular difficulty of drop in tension or fall of pressure,—loss of electro-motive force,—due to the resistance of the conductors to the electric flow. To remedy the evil effect therefrom the patentee provides special conductors for the transmission of electricity, extending from the generator to the main conductors with which the lamps are connected, and from which they are served. The patent is for a specific arrangement and proportioning of the two sets of conductors, which together constitute the complete circuit. The claims in question are perfectly clear and definite. Each claim is for a combination consisting of two constituents, namely, a consumption circuit in the main conductors of which the drop in tension is not sufficient to vary practically the candle power of the lamps connected therewith, and feeding conductors (a feeding circuit) having no translating devices thereon, uniting the consumption circuit with the source of electrical energy. Any electric consumption circuit, the main conductors of which are so proportioned that the drop in tension therein is not sufficient to vary practically the candle power of its lamps, in combination with feeding conductors on which are no translating devices, falls within the scope of the claims. Plainly, each of these claims is for a single circuit composed of a pair of transmitting conductors and a pair of distributing conductors having the specified characteristics, without regard to any other like circuit. The gist of the alleged invention is in the combination and proportioning of the two parts of the circuit, and not in the scale of use. Contrary to these views, the circuit court was of the opinion that certain unexpressed qualifications are to be incorporated into each of the claims by virtue of the concluding words, "substantially as set forth." After discussing the specified limitations the court said:

"But this statement of the claims would be highly inaccurate, if permitted to stand alone. Other limitations must be regarded. Not only are the circuits, feeding and consumption, unique in their special characteristics, but, as well, are jointly applicable to the lighting by incandescent lamps, in multiple arc, of large areas, of which portions or parcels are very distant or remote from a central station, from which, however, emanates complete control. It is true that these latter limitations are not expressed in terms in the claims under consideration, or in either of them. But, in drafting the claims, Mr. Edison, by the words used, clearly referred to the descriptive phraseology of the specifications of his invention preceding them."

Accordingly, the court construed these several claims as involving the lighting of a "large territory," by the use of "large numbers" of incandescent lamps, and as implying central station regulation whereby variable drop in tension in remote parts of the system may be controlled. But in our judgment these limitations are inadmissible. The fact is, pending the application for this patent

it was sought to amend the specification, and insert a new claim by the introduction of the matter of central station regulation; but the patent office rejected the proposed amendment for the assigned reason that "it describes and claims an invention not even hinted at in the original specification, nor shown in any of the drawings." While central station regulation is incidentally referred to in the introductory part of the specification, it is not described at all, and clearly is no part of this alleged invention. The only described means to secure equality of pressure between the lamps of a circuit near the central station and the lamps of a circuit more remote therefrom are resistance coils put in the supply conductors of the near circuit. This device is covered by the fifth claim, infringement of which is not charged. The claims in question are unambiguous and exact. Upon well-settled principles, then, limitations other than those expressed are to be excluded. *Railroad Co. v. Mellon*, 104 U. S. 112; *Manufacturing Co. v. Greenleaf*, 117 U. S. 554, 6 Sup. Ct. 846; *White v. Dunbar*, 119 U. S. 47, 52, 7 Sup. Ct. 72. As was said in the last-cited case:

"The claim is a statutory requirement prescribed for the very purpose of making the patentee define precisely what his invention is; and it is unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms."

The claims here, we think, were purposely framed broadly, so as to cover the simplest form of the alleged invention.

The claims with which we are concerned, as we have seen, are each for a combination of two elements,—a consumption circuit and feeding conductors having respectively the peculiar properties specified. The primary question for solution, then, is whether it involved invention, in a patentable sense, to combine a circuit for feeding only with a consumption circuit, the main conductors of which are so proportioned as to maintain such uniformity of pressure upon them that there is practically no variance in the candle power of the lamps connected therewith.

Now, a claim for a combination carries with it an implication that the separate elements are old. Says Mr. Justice Bradley, speaking for the court, in the case of *The Corn-Planter Patent*, 23 Wall. 181, 224:

"Where a patentee, after describing a machine, claims as his invention a certain combination of elements, or a certain device or part of the machine, this is an implied declaration,—as conclusive, so far as that patent is concerned, as if it were expressed, that the specific combination or thing claimed is the only part which the patentee regards as new."

In the present instance the positive proofs accord with the implication. Most certainly the patent in suit discloses no new means either for transmitting a current of electricity, or for equalizing pressure upon the consumption circuit. It is to be noted that the patent leaves it altogether to the judgment of the electrical engineer or constructor to determine the relative lengths of the two parts of the combined circuit, and the proper thickness of the conductors. As to these points no definite instructions are given. Undoubtedly it was well known prior to the alleged invention that

a large quantity of electrical energy could be transmitted a considerable distance by a conductor of small size. Now, with respect to the loss of pressure upon the feeding conductors, which loss depends upon the thickness of the conductors, the specification tells us that "this loss will be varied according to localities, and the relative cost of copper for conducting purposes and horse power for generation." It is said that in large and extended systems this loss would generally be greater than the loss upon the main conductors of the consumption circuit, and "may be, for example, about fifteen per cent.," but that circumstances might make it desirable to diminish the loss down even as low as that upon the main conductors of the consumption circuit, or to increase the loss upon the feeders to more than fifteen per cent. Thus is it left, where indeed it properly belongs, to the intelligence of the electrical engineer to select feeding conductors of larger or smaller diameter, depending upon the comparative cost of copper and of power, or upon some special circumstances. Of a truth, the feeding conductors of the patent are nothing more than the ordinary supply wires running from the source of the electrical energy. The proper function of such conductors being to transmit the electric current to the point where it is to be utilized, as a matter of course they have no "translating devices connected therewith." The statement in the specification, "it will be seen that the drop upon the feeding conductors has no effect upon the relative candle power of the lamps of the system, the relative candle power of the lamps being affected only by the drop upon the main conductors of the consumption circuit or circuits between the end of a set of feeding conductors and points most distant from any feeding conductors," is the mention of an obvious fact. Indeed, it is put as a self-evident proposition. That no loss upon the supply part of the circuit can affect the relative candle power of the lamps upon the consumption part of the circuit is a quality inhering in the circuit by the very nature of things. It is a necessary incident of any circuit, part of which supplies the current and part of which distributes it.

The specification states that, "in order to maintain practically the same candle power throughout the system, the main conductors of the consumption circuit or circuits should be so proportioned that the drop in tension upon them shall not exceed a definite small limit, for example, five per cent.," but gives no information whatever how this is done. This silence is highly significant. The specification assumes that to secure uniformity of electrical pressure, and thus uniformity of effect, is a matter of common knowledge among those skilled in the electrical art, as indeed it was. The drop or fall in tension or pressure in an electrical current in its passage through a conductor was an observed and well-understood phenomenon long prior to the year 1880. It was known that its cause was the resistance offered by the conductor to the flow of the current, and the laws governing the flow of electricity and the drop in tension had been ascertained and published, and were perfectly familiar to all skilled electricians. They understood the effect upon the drop in

tension of variations in the size and length of the conductor and of changes in the electromotive force of the generator; and the ascertainment of the proportions to be given to a conductor to secure a definite fall in pressure with a given current was a mere matter of calculation, to aid which formulæ had been worked out.

In the art of electroplating, as practiced long before 1880, we find an arrangement of circuits substantially the same as that of the patent in suit. Here a large number of articles to be plated simultaneously are suspended in the bath by separate wires attached to a metallic rod placed across the top of the tank; that is to say, the articles are arranged in multiple arc with respect to the electric current. The rod is supplied with the current by conducting wires which connect the rod with the dynamo, and the current divides among the suspended articles. It will be perceived that here one part of the circuit is used exclusively for transmitting the current, and the other part for distributing it. Equality of electric pressure among the articles to be treated is essential to good work, and in fact the distributing rods were made of such size that any material fall in pressure was avoided.

Turning now to the Khotinsky French patent of 1875, which relates to the art of electric lighting, we discover that it shows and describes a circuit of feeding and consumption parts in combination, identical in form with that of the patent in suit. The lamps of Khotinsky's system are incandescent lamps, and they are arranged in multiple arc. He shows a magneto-electric machine located "in the center of this system, or at any other point." From the magneto-electric machine run two "conducting wires," with which no translating devices are connected. These conducting or feeding wires connect with the "main conductors" of the circuit, with which all the lamps are connected. In his diagrams 1 and 3 the feeding conductors connect with the center of the consumption circuit, and in diagram 2 at the end. Undeniably, Khotinsky's combined arrangement of feeding conductors and distributing conductors is precisely the arrangement of the patent in suit. Nothing, indeed, is said by Khotinsky about proportioning the main conductors of the consumption circuit so as to prevent injurious drop in tension. It was, however, wholly unnecessary for him to say anything upon that subject. All that was needful to overcome the difficulty due to drop in tension was to make the main conductors of the consumption circuit of proper thickness. The laws governing the flow and distribution of electricity in conductors were perfectly well known to electricians at the date of Khotinsky's patent, and any electrical engineer of ordinary skill then called on to construct a circuit of Khotinsky's system, it is to be assumed, would have acted in accordance with common electrical knowledge, principles, and practice; in other words, he would have made the main conductors of the consumption circuit sufficiently large to be of practical utility. How can it be affirmed that it would require invention simply to proportion Khotinsky's circuit in the manner contemplated by the patent in suit,—to make his transmitting wires and distributing

conductors respectively of suitable size to perform their intended functions?

Now it is quite true that prior to the year 1880 electric lighting for ordinary domestic purposes was not an accomplished fact. But this was not for lack of anything shown by the patent in suit. The great desideratum was a practical incandescent lamp. Such a lamp, with a filamental carbon conductor of high resistance, and burning with a very small amount of current, was devised in or about the year 1879, and it solved the problem of the practical subdivision of the electric current for incandescent lighting. The principle of this lamp was pronounced by Mr. Justice Bradley, in *Consolidated Electric Light Co. v. McKeesport Light Co.*, 40 Fed. 21, 29, to have been "the grand discovery in the art of electric lighting, without which it could not have become a practical art for the purposes of general use in houses and cities." Such were the views which prevailed in the second circuit in the case of *Edison Electric Light Co. v. United States Electric Lighting Co.*, 47 Fed. 454; *Id.*, 3 C. C. A. 83, 52 Fed. 300,—where it was decided that Mr. Edison was the first and original inventor of this lamp.

Under the proofs, we cannot assent to the suggestion that the alleged invention here in question supplied a long-felt want, or met a difficulty generally recognized in the art as a serious hindrance to the distribution of the electric current. In fact, prior to the application for this patent no incandescent electric lighting plant had been built. There had been no occasion to erect such plants, for no practically successful incandescent lamp had yet been furnished to the public. Hence electrical engineers had not been called upon to deal practically with the problem of drop in tension in the construction of such plants. In truth, the feeder and main system of distribution came naturally, in the ordinary progress of the art of incandescent electric lighting, as and when needed.

In his Cantor Lectures of February, 1885 (put in evidence by the plaintiff below), Prof. George Forbes, speaking of this feeder and main system, well said, "It is a result which would certainly have been arrived at by any one who thoroughly and intelligently worked out the problem." True, he added that, so far as he could discover, Mr. Edison "was the first, by a long time, to hit upon this cure for the evil." But this latter statement is without significance when we reflect that a practical incandescent lamp, without which domestic electric illumination was impossible, was invented so short a time before the application for this patent, and that when the occasion for its use actually arose the feeder and main system was forthcoming.

It is a great mistake, as the proofs demonstrate, to attribute to the patent in suit the merit of having solved the problem of economically supplying the requisite current for extensive use to circuits covering large areas, portions of which are at great distances from the source of electrical energy. Whatever of economy in copper may result from the plan of the patent is confined altogether to the transmitting conductors, and the cost of copper restricts the use of this system to comparatively narrow limits.

The extension of incandescent electric lighting over large areas is really due to subsequent inventions. Conspicuous among the more recent discoveries and improvements which have brought incandescent lighting into extensive and common use is the converter or alternating current system, whereby the electric current is transmitted from the generating station to a very great distance at an extremely high pressure, and is converted at the points of distribution into the low-pressure currents required by the incandescent lamps.

The multiple-arc or derived-circuit system of distribution being confessedly old, and the high-resistance incandescent lamp having been devised, to provide "feeding conductors which extend from the generator or generators to the main conductors of the lamp or consumption current," was, it seems to us, an obvious engineering expedient. Then, as already shown, the proper proportioning of the two parts of the combined circuit involved only the exercise of the common knowledge and skill of the electrician. The facts, we think, clearly bring this case within the principles announced by the supreme court in the case of *Hollister v. Manufacturing Co.*, 113 U. S. 59, 5 Sup. Ct. 717, and in kindred cases. The plan of electric distribution covered by the claims in question is not "the creative work of that inventive faculty which it was the purpose of the constitution and patent laws to encourage and reward." To sustain these claims would be to sanction a monopoly in that which belongs to the public.

In announcing this conclusion we cannot do better than quote some observations of the supreme court which apply with great force to this case, as we read the proofs. In *Atlantic Works v. Brady*, 107 U. S. 192, 199, 2 Sup. Ct. 225, the court said:

"The process of development in manufactures creates a constant demand for new appliances, which the skill of ordinary head workmen and engineers is generally adequate to devise, and which, indeed, are the natural and proper outgrowth of such development. Each step forward prepares the way for the next, and each is usually taken by spontaneous trials and attempts in a hundred different places. To grant to a single party a monopoly of every slight advance made, except where the exercise of invention, somewhat above ordinary mechanical or engineering skill, is distinctly shown, is unjust in principle and injurious in its consequences."

The appellant maintains that under the ruling of the supreme court, in the case of *Miller v. Manufacturing Co.*, 151 U. S. 186, 14 Sup. Ct. 310, the first, second, and third claims of the patent in suit are void, because of the grant of an earlier patent to Mr. Edison, No. 239,147, dated March 22, 1881, which dealt with the evil of drop in tension, and provided a remedy by feeding conductors, having no lamps therein, connected with the mains of the consumption circuits arranged in sets concentrically around the central generating station, and so proportioned as to secure equal electrical pressure throughout the entire system. It is contended that the invention described and claimed in the earlier patent is for one form of the alleged invention described in the later patent, and covered by the first three claims thereof, and that no one could use the invention of the earlier patent without infringing these later claims. The question thus

raised is a serious one, but we do not deem it to be necessary to consider it, inasmuch as the views we have expressed upon the other branch of the case are decisive.

The decree of the court below is reversed, and the cause is remanded, with directions to enter a decree dismissing the bill of complaint, with costs.

BEACH v. AMERICAN BOX-MACHINE CO. et al.

(Circuit Court, N. D. New York. October 15, 1894.)

No. 6,170.

1. **PATENTS—ANTICIPATION—TESTS OF INVENTION—MECHANICAL SKILL.**
Whether it required more than mechanical skill to change an alleged anticipating machine into the machine of the patent is to be determined by the inquiry whether a mere mechanic would derive from the prior machine the suggestion which would lead him to make the change.
2. **SAME—INVENTION—COMBINATION—NEW RESULTS.**
Apparently slight changes producing a new combination and a new and beneficial result raise presumption of invention.
3. **SAME—VALIDITY OF REISSUE—MISTAKE IN DRAWINGS.**
Reissue is warranted by mistake in drawings which renders the machine inoperative in part only.
4. **SAME—AMPLIFICATION OF DESCRIPTION AND CLAIMS.**
A claim may be made more full and complete, by amendment, without new oath, if no new invention is claimed, and the old claim is not materially broadened.
5. **SAME—INFRINGEMENT—PAPER BOX MACHINE.**
Where the two machines perform the same work in substantially the same way, infringement is not avoided by the fact that one part of defendant's machine does a little more, and the other a little less, than corresponding parts in complainant's machine.
6. **SAME—PARTICULAR PATENT.**
The Beach reissue, No. 11,167, for a machine for attaching stays to the corners of paper or strawboard boxes, sustained and declared infringed.

This was a suit in equity by Fred H. Beach against the American Box-Machine Company and Horace Inman and others for the infringement of a patent. On final hearing.

Benjamin F. Lee and John Dane, Jr., for complainant.
Edmund Wetmore and William A. Redding, for defendants.

COXE, District Judge. This action is founded upon reissued letters patent No. 11,167, granted to the complainant May 26, 1891, for a machine for attaching stays to the corners of paper or strawboard boxes. The application for the original was filed June 10, 1885. The original, No. 447,225, was dated February 24, 1891. The application for the reissue was filed April 9, 1891. Prior to the invention it had been customary, says the patentee, to apply the fastening strips over the joints at the corners of the boxes, and paste them there, by hand. This work is now done by the patented machine. The claims involved are as follows:

"(1) The combination, with opposing clamping dies having diverging working faces, of a feeding mechanism constructed to deliver stay strips between