street cars commercially possible and profitable; and, third, the invention of a practical contact device for keeping constant the connection between the overhead wire used for carrying the positive electricity and the moving car. This last device was invented by Van De Poele in 1886 or 1887, and is called the "under-running trolley." Other contact devices were invented and known before Van De Poele's, but, although cars could be moved by them, they did not prove to be efficient, or really practical. When Green applied for his patent, in 1879, so far as this record shows, there was no operative and practical contact device known to the art for connecting moving cars electrically with an overhead wire. It therefore follows that the indefinite suggestion of independent conductors in Green's patents cannot be enlarged or pieced out by reference to the art to make an operative combination of that which we find in defendants' railway, to wit, a stationary source of electrical supply, a circuit consisting of an outgoing current to the car by an overhead wire and a suitable contact device, and a return circuit by the wheels and the rails or the earth. A careful reading of the history of Green's patent in the 12 years his application was pending in the patent office, leaves no doubt in our minds that the combination for which Green intended to procure a patent, and the only one he did intend to patent, and the only one he was entitled to have patented, if any, was a circuit in which the rails were to form the conductors, and the wheels were to be the collectors or contact devices. The really accidental reference to independent conductors contained in the original application of Green was made the unfounded basis as the art progressed, and as the fact that success was to lie with the overhead conductor became plain, for changes of language in the specifications and claims which give color to the argument that the combination intended and disclosed by Green when he filed his application really included independent conductors and other contact devices than the wheels. We concur, therefore, in the view of the judge of the circuit court that the defendants' railway does not infringe the patents of the complainant. The decree of the circuit court dismissing the bill is affirmed.

WALDO v. AMERICAN SODA FOUNTAIN CO.

(Circuit Court, D. New Jersey. March 16, 1899.)

PATENTS—LICENSE TO SELL AND MANUFACTURE—CONSTRUCTION.

The complainant, being the owner of letters patent of the United States No. 264,586, for an improvement in soda-water apparatus, executed a license to a firm, conferring upon it, among other things, the exclusive right to make, use and sell the patented invention as applied to new soda-water apparatus "of their own manufacture only," and providing that the license "shall be binding on the parties hereto, their heirs, successors, administrators or assigns, and shall be valid until the 19th day of September, 1899, or unless sooner terminated by the written consent of both parties hereto." *Held*, on consideration of all the provisions in the license, that in imposing the restriction "of their own manufacture only" the complainant intended that the right to make, use and sell the

patented invention as applied to new apparatus should only be confined to such person or persons as should hold the license from time to time during its term and manufacture such apparatus, and not exclusively to the firm, and that therefore the license was assignable.

(Syllabus by the Court.)

In Equity.

Denis A. Spellissy, for complainant.

Clarkson A. Collins, for defendant.

BRADFORD, District Judge. The bill in this case charges infringement of letters patent of the United States No. 264,586, for an improvement in soda-water apparatus issued to the complainant September 19, 1882, and prays for an injunction and an account. The patented invention is an acid-feeder used in connection with such apparatus. The defendant by way of plea justifies the acts complained of as infringements by virtue of a license executed by the complainant to the firm of John Matthews and subsequently, as alleged, assigned to the defendant. On or about March 16, 1886, the complainant and the firm of John Matthews, a co-partnership then composed of John H. Matthews and others, entered into an agreement under seal, as follows:

"This agreement, entered into this thirteenth day of March, 1886, between the firm of John Matthews, of New York, in the County and State of New York, party of the first part, and Francis S. Waldo, of the same place, party of the second part, witnesseth:

"Whereas, the said party of the second part is the owner of letters patent of the United States No. 264,586, issued Sept. 19th, 1882, for an acid-feeder for use on soda-water apparatus,

"And whereas, the said party of the first part is desirous of acquiring the exclusive right of manufacturing, using and selling said patented invention as applied to new machinery, and also the right to apply the same to old machinery,

"And whereas, the said party of the second part has granted unto one Martin V. B. Watson, of San Francisco, California, the exclusive right for the term of five years of manufacturing, using and selling said invention in the states of Nevada, California, Oregon and the Territories of Idaho, Washington, Arizona, Montana and Utah, which license will expire September 12th, 1889,

"Now, in consideration of the sum of one thousand dollars ($1,000) in hand paid to said party of the second part by said party of the first part, the receipt of which is hereby acknowledged, and of the covenants and conditions hereinafter contained, to be well and truly kept by said party of the first part, the said party of the second part has granted and by these presents does grant unto said party of the first part the exclusive right, liberty and license for the whole term of said letters patent, of making, using and selling said patented invention as applied to new machinery of their own manufacture only for that part of the United States not covered by the license to M. V. B. Watson hereinabove set forth, and at the expiration of said license to Watson the exclusive right of making, using and selling the said patented invention throughout all the United States and territories thereof as applied to new machinery.

"It is agreed, that said party of the first part shall have the further right, which shall not be exclusive, of manufacturing and selling said patented invention to be applied to old machinery until the number sold, including those sold to be applied to new machinery, as hereinafter expressed, shall reach one thousand (1,000) and that when said number shall have been sold, the right of the party of the first part to sell said patented invention to be applied to old machinery shall cease and determine.

"It is agreed, that in the construction of this agreement the term 'new machinery' shall refer to machinery which shall have been used for less than six months, or not at all, before the improvement is applied thereto, and the term 'old machinery' to machinery which shall have been in use for more than six months before the improvement is applied thereto.

"It is agreed, that every article containing the patented invention, and sold by either of the parties hereto, shall be marked with the word 'patented' and with the number or date of the patents, and shall be accompanied by a user's license properly filled out and signed by the party selling, the form of said license being annexed hereto and marked 'Schedule A.'

"The parties hereto hereby agree not to sell below the prices in 'Schedule B' annexed, but said prices may be changed at any time by mutual agreement; said party of the second part agrees not to sell said patented invention for use on old machines to any manufacturer of soda-water apparatus, and to advertise the fact that the said party of the first part has the exclusive right of selling said patented invention for application to new machinery.

"Said party of the first part agrees to advertise and endorse said invention in their catalogue and advertisements and through their salesmen, and not to sell said invention directly or indirectly to other manufacturers of soda-water apparatus.

"Said party of the second part agrees to pay to said party of the first part a commission of twenty (20) per cent. on the selling price of the patented acid-feeder on all orders for the same turned over to him by said party of the first part, provided he accepts the order, said payments to be made at the time said party of the second part is paid for said acid-feeder.

"It is agreed that full and true accounts shall be kept by each party hereto of every license issued by said party, such account to contain an accurate description of the machine to which said license is applied, name and address of the purchaser and date and terms of sale. And such account is to be open to the inspection of the other party to this agreement at any reasonable time.

"The said party of the first part agrees to render to said party of the second part annually on the first day of August, or within twenty days thereafter, a sworn statement of all users' licenses granted by them during the preceding year.

"In further consideration of said sum of one thousand dollars the said party of the second part covenants and agrees that he has a full and unincumbered title to the patent hereby licensed, with the exception of the license to Watson hereinabove set forth.

"This agreement shall be binding on the parties hereto, their heirs, successors, administrators or assigns, and shall be valid until the 19th day of September, 1899, or unless sooner terminated by the written consent of both parties hereto.

"In testimony whereof, the said parties have hereunto set their hands and seals the day and year first above written.

Firm of John Matthews. [Seal.]
J. Matthews.
F. S. Waldo. [Seal.]

"Sealed and delivered in the presence of Joseph Connor.

"Interlining page 2, between lines 4 and 5, were there at the time of signing above. J. C."

"Schedule A.

"License No.

"In consideration of $ paid or to be paid we hereby license Mr. of to use the invention known as the Waldo acid-feeder, covered by letters patent No. 264,586, issued Sept. 19th, 1882, on his one generator, of which the following is a full and accurate description.

"It is distinctly understood that this license applies to above-described generator only, and the use of the invention without proper license on any other generator will subject the user to a suit for infringement of above letters patent.

"[Signed] F. S. Waldo, Inventor.
Firm of John Matthews, Licensee."

"Schedule B.

"Schedule of Prices.

"Price of feeder, including license to use to be until otherwise agreed, not less than $50.

Firm of John Matthews,
J. M.
F. S. Waldo."

Afterwards, on or about June 25, 1891, the surviving members of the firm of John Matthews and the personal representatives of such deceased persons as had been entitled to any interest or share in the property and assets thereof executed an assignment purporting to transfer absolutely to the defendant, among other things, the above license, subject to a certain proviso not material to be considered here. The defendant claims that the license from the complainant to the firm was assignable and was validly assigned to the defendant, and that all its acts in the manufacture, use and sale of the patented acid-feeder were within the scope of the license. It further claims that if the license should be held not assignable, the defendant was nevertheless entitled to the benefit of it, not as assignee, but as successor to the business of the firm. The complainant, on the contrary, contends that the license was not assignable and that the defendant was not such a successor to the business of the firm as to entitle it to its protection. The license is inartificially drawn and an ascertainment of its scope or assignability or non-assignability involves careful examination and consideration of it as a whole. The draft when first submitted to the complainant for execution did not contain in the paragraph next following the recitals the words "of their own manufacture only." The evidence shows that he refused to sign the contract unless those words should be incorporated therein, for the reason that, without them, he thought "it would be a general license; it was not intended to be a general license." There was consequently an interlineation of those words and thereupon the contract was executed. The insertion, under the circumstances, of the words "of their own manufacture only" materially affected the scope of the license as embodied in the draft as first submitted. In so far as they were in conflict or inconsistent with any of the provisions in the instrument, they controlled, modified or qualified such provisions. Before the interlineation, the above-mentioned paragraph purported in effect to grant to the firm the exclusive right until September 12, 1889, to make, use and sell the Waldo feeder as applied to new machinery in all parts of the United States except Nevada, California, Oregon, Idaho, Washington, Arizona, Montana and Utah, and after the last-named day and for the balance of the whole term of the letters patent the exclusive right to make, use and sell such feeder as applied to new machinery throughout the United States. Had the license been executed without the interlineation, the complainant would have wholly divested himself for the balance of the term of the letters patent of the right to make, use or sell his patented feeder as applied to new machinery which, under the contract, was soda water apparatus used for less than six months, or not at all, before the application thereto of such feeder. The insertion of the words "of their own manufacture only" materially narrowed the scope

of the rights which would have been conferred on the firm by the execution of the license in the terms of the original draft. The complainant by the license as executed granted to the firm, among other things, "the exclusive right, liberty and license for the whole term of said letters patent, of making, using and selling said patented invention as applied to new machinery of their own manufacture only for that part of the United States not covered by the license to M. V. B. Watson hereinabove set forth, and at the expiration of said license to Watson the exclusive right of making, using and selling the said patented invention throughout all the United States and territories thereof as applied to new machinery." There can be no question that until the expiration of Watson's license on September 12, 1889, the right conferred on the firm was restricted to the making, using and selling of the patented feeder solely in connection with new soda-water apparatus manufactured by the firm and until then the complainant retained the exclusive right to make, use and sell such feeder, except within the territorial limits mentioned in Watson's license, as applied to new apparatus other than that manufactured by the firm. I am further satisfied that after September 12, 1889, while the firm had the exclusive right for the balance of the term of the letters patent to make, use and sell throughout the United States the patented feeder in connection with new apparatus manufactured by the firm, the complainant retained the exclusive right for the balance of the term to make, use and sell throughout the United States such feeder as applied to new apparatus other than that manufactured by the firm. There is some inconsistency in the terms of the above provision. The latter portion of it purports to grant to the firm the exclusive right, at the expiration of Watson's license, to make, use, and sell throughout the United States the patented feeder as applied to new apparatus, without any restriction of that right to acid-feeders as applied to apparatus manufactured by the firm. This portion of the provision standing alone would negative the existence of any right on the part of the complainant after September 12, 1889, to make, use or sell the patented feeder in connection with new apparatus in any part of the United States. But it must be read in the light of what precedes it. The preceding part of the clause grants to the firm the exclusive right "for the whole term of said letters patent of making, using and selling said patented invention as applied to new machinery of their own manufacture only for that part of the United States not covered by the license to M. V. B. Watson." Here the exclusive right is expressly restricted for the term of the patent to making, using and selling in the United States, save in the excepted territory, the Waldo feeder in connection with new apparatus manufactured by the firm. It cannot be assumed that the complainant intended in and by the same sentence in which he expressly limited the exclusive right for the balance of the term to feeders as applied to new apparatus manufactured by the firm to remove that restriction during the term and permit the firm to make, use and sell the feeder to be used in connection with new apparatus by whomsoever manufactured. Nor can it be assumed that he intended that after September 12, 1889, the exclusive right of the firm

under the license should be more extensive in Nevada, California, Oregon, Idaho, Washington, Arizona, Montana and Utah than elsewhere in the United States. The complainant, having given an exclusive license to Watson for the above named states and territories for a limited period, granted to the firm an exclusive right in all other portions of the United States for the term of the patent, restricted to the application of the feeder to new apparatus of their own manufacture. Had it not been for that outstanding license it is reasonable to assume that the same exclusive but restricted right would simply and without circumlocution have been granted to the firm throughout the United States. It was evidently the intention of the complainant that the firm should on the expiration of Watson's license have for the residue of the term of the patent the same exclusive but restricted right in the territory theretofore occupied by Watson as well as in other portions of the United States. It is true that in a subsequent clause of the license the complainant agreed "to advertise the fact that the said party of the first part has the exclusive right of selling said patented invention for application to new machinery." This provision, taken literally, is in direct conflict with the paragraph above considered, where the interlineation was made as the condition on which the license was executed. The same effect must therefore be given to it as if it contained at the end thereof the words "of their own manufacture only." The conclusion I have reached on this branch of the case is that after September 12, 1889, the firm had under the license the exclusive right throughout the United States to make, use and sell the Waldo feeder as applied to new apparatus of their own manufacture, and the complainant retained the exclusive right throughout the United States, subject to certain sitpulations in the license unnecessary to be considered here, to make, use and sell such feeder as applied to new apparatus not manufactured by the firm. The license further provided that the firm "shall have the further right, which shall not be exclusive, of manufacturing and selling said patented invention to be applied to old machinery, until the number sold, including those sold to be applied to new machinery, as hereinabove expressed, shall reach one thousand (1,000), and that when said number shall have been sold, the right of the party of the first part to sell said patented invention to be applied to old machinery shall cease and determine." No charge of infringement can be sustained with respect to this provision. The evidence does not show or tend to show that it has been violated.

I now come to the question whether the license was assignable to the defendant. As an express contract it, like other express contracts, must be construed according to the intention of the parties as disclosed by the language therein employed. It is well settled that "a mere license to a party, without having his assigns or equivalent words to them, showing that it was meant to be assignable, is only the grant of a personal power to the licensees, and is not transferable by him to another." Nail Factory v. Corning, 14 How. 193. It is strongly urged on the part of the complainant that the license was strictly personal and therefore not assignable. There is doubtless some color for this contention. The right of the firm

to make, use and sell the patented feeder in connection with new apparatus was confined to apparatus "of their own manufacture only." The printed form of a user's license set forth in Schedule A contains the names of "F. S. Waldo, Inventor" and "Firm of John Matthews, Licensee." So the stipulation as to the price of a Waldo feeder, including the right to use the same, set forth in Schedule B, bears the names of "Firm of John Matthews" and "F. S. Waldo." The license further provided that "it shall be valid" for the term of the patent "unless sooner terminated by the written consent of both parties hereto." There are also other stipulations in the license which, considered alone, seem to involve personal confidence as between the parties. But can this contention be sustained? The concluding paragraph of the agreement is as follows:

"This agreement shall be binding on the parties hereto, their heirs, successors, administrators or assigns, and shall be valid until the 19th day of September, 1899, or unless sooner terminated by the written consent of both parties hereto."

It is asserted on the part of the complainant that this clause did not render the license assignable, but only provided for its duration and operated to make "heirs, successors, administrators or assigns," responsible for previous violations of its stipulations while subsisting between the complainant and the firm. But such an interpretation is inadmissible. Heirs and administrators would, with respect to their decedents' estates, have been liable in such case without any express declaration on the subject. The use of the word "assigns" in this connection would, so far as it relates to assigns of the firm, be unintelligible unless predicated on the right of the firm to assign the license. The word "successors" may fairly be applied to the firm as varying in its constituent members from time to time. Further, the license was by its express terms to be valid until the expiration of the term of the patent unless sooner terminated, not by death or by assignment, but by the written consent of both parties. The provision as to the continuance of the license in juxtaposition with the declaration that it should bind "the parties hereto, their heirs, successors, administrators, or assigns," plainly indicates when taken alone an intention by both parties that it should at any time during the term of the patent be assignable unless sooner terminated by consent. I have not discovered on careful examination of the various provisions of the license anything sufficient to negative this apparent intention. While it is true that the words "of their own manufacture only" are used, and the words "Firm of John Matthews, Licensee" are appended to the form prescribed for the user's license, and the words "Firm of John Matthews" appear in the stipulation as to the price of the patented feeder, the main license, if assignable, would mutatis mutandis be equally operative as between the complainant and the assignee. In such case the above restriction would relate to apparatus of the manufacture of the assignee only, and the assignee's name would be substituted for that of the firm of John Matthews in the user's license and stipulation as to price. So, too, the written consent required for the termination of the license within the term of the patent would

be that of the complainant or his assigns and the assignee. In imposing the restriction "of their own manufacture only" the complainant must be held to have intended that the right to make, use and sell the patented feeder as applied to new apparatus should only be confined to such person or persons as should hold the license from time to time during its term and manufacture such apparatus, and not exclusively to the firm of John Matthews. This construction of the license does not involve such hardship to the complainant as to render it unreasonable. He granted the exclusive right to the firm to make, use and sell his acid-feeder as applied to new machinery of its own manufacture. He retained such exclusive right as to new apparatus not manufactured by the firm. The license was for the balance of the whole term of the patent, and the firm had paid to the complainant a gross sum of money for the right secured from him. There was no stipulation or restriction as to the number of persons who should be employed by the firm in the manufacture and sale of new apparatus to which the exclusive right of applying the patented invention related, or as to the amount of capital which should be employed in carrying on its business. The firm had the right to invest unlimited capital in its business, and to establish branches in all parts of the United States. Under these circumstances, and in view of the express provision that the license should bind assigns, the license, in my opinion, clearly was assignable and was validly assigned to the defendant June 25, 1891. It does not appear from the evidence that the defendant at any time made, used or sold the patented invention except as applied to and forming part of new soda-water apparatus manufactured by it, nor that it made, used or sold the same at any time prior to the execution of the above assignment. The conclusion reached renders unnecessary any discussion of the question whether, if the license had not been assignable, the defendant was such a successor of the firm or succeeded to the business of the firm in such manner as to entitle it to the benefit and protection of the license.

The bill must be dismissed with costs.

PENFIELD v. CHAMBERS BROS. CO.

(Circuit Court of Appeals, Sixth Circuit. March 7, 1899.)

No. 572.

1. PATENTS—CONSTRUCTION OF CLAIMS—INFRINGEMENT—MECHANICAL EQUIVALENTS.

   The more meritorious an invention, the greater the step in the art, the less the suggestion of the improvement in the prior art, the more liberal are the courts in applying the doctrine of equivalents; and the narrower the line between the faculty exercised in inventing a device and mere mechanical skill, the stricter are the courts in rejecting the claim of equivalents in respect of alleged infringements.

2. SAME—INVENTION—COMBINATIONS—USE OF CAMS.

   Where resultant motion is obtained by a stationary cam guiding a tool, it may often, but not necessarily, be an obvious change to reverse the

parts by making the cam movable and the tool stationary. The question whether it is obvious is to be determined by examination of the particular machine in which the change is made.

3. SAME—INFRINGEMENT.
An infringer cannot evade liability by deliberately diminishing the utility of the invention without materially changing its form, its chief function, or its manner of operation.

4. SAME—BRICK-MAKING MACHINES.
The Chambers patent, No. 297,671, for improvements in brick machines, *held* valid, and infringed as to claim 24, which covers a transfer roller in combination with and placed between the propulsion belt carrying the bar of clay, and the off-bearing belt, designed to remove the bricks after their severance from the bar by the cut-off device.

5. SAME.
The Chambers patent, No. 362,204, for improvements in brick machines, construed, and *held* not infringed as to claims 7, 9, 10, 11, and 12, which cover a rotatable reel device for cutting off the bricks from the moving bar of clay.

6. SAME.
The Chambers patent, No. 207,343, for improvements in brick machines, is void for want of invention as to claim 6, covering the expressing screw, having its mouth set in a particular relation to the first tempering knife.

7. SAME.
The Chambers patent, No. 297,675, for an improvement in brick machines, is void, for want of invention, as to claim 2, which covers the combination of the forcing screw and the tempering knives arranged on the shaft, the first two knives being located with relation to each other and the screw in the particular manner shown.

8. SAME.
The Chambers patent, No. 275,467, for improvements in brick machines, is void, for want of invention, as to claim 1, which covers a former die having its top and bottom convex, and its sides straight or concave.

Appeal from the Circuit Court of the United States for the Northern District of Ohio.

The following is the opinion of the court below (Severens, District Judge):

In this case the claims in the complainant's patents which have been made the basis of the suit are very numerous, and have required and received prolonged attention. The court has been made impressed with the merit of the many inventions of Mr. Cyrus Chambers, Jr., relating to the subject involved, —that of the construction of brick-making machines,—and thinks it just to say that, in its view, he has probably done more than any other man to bring this class of machines to the wonderful degree of perfection it has attained. But it is also right to say that he had been preceded by many other inventors in the field, and that many others have been working on the same subject contemporaneously with him. The Chambers inventions are not strictly primary ones, but relate to improvements upon existing machines; and several of these inventions display great ingenuity, and are evidently the result of protracted observation and study. To the extent of such improvements, and on account of their manifest value, they deserve the full measure of protection which the law affords. The time at my command will not permit of a detailed statement of the reasons upon which the court has reached its conclusions in respect of these several claims, and of the questions involved in the mechanism of the defendants' machine, which is alleged to infringe them. If time and opportunity permit, I may hereafter explain more at length the grounds and reasons upon which some of the present conclusions are founded, but I cannot promise it.

The patents of the complainant relate almost entirely to combinations of the various elements of mechanism of which they are made up, and consist in the

main of two classes, viz. those which relate to the apparatus for cutting off bricks, and, incidentally thereto, the carrying them away from the point where they are cut off in such a way as to prevent their becoming marred by the apparatus for cutting them off, and the accumulation of the bricks after they are formed; and, secondly, those which are involved in that part of the machine which is employed in pugging or grinding clay and expressing it through the die upon the propulsion belt upon which it is carried along in a bar to the cut-off apparatus already mentioned. Although this is not in the natural order of the operation in the employment of the machine, it is the order in which the case was presented by counsel for the complainant in the argument, and is as convenient as any.

Claim 7 of Claimant's Patent No. 297,671.

The validity of this claim is disputed upon the ground that it was anticipated by a British patent to Ainslie in 1841; by the French patents of Buzelin, 1872, and of Combe d'Alma and Dupin, 1876; by the American patents to Adamson, No. 106,448, to Gard, No. 255,385, to Sword, No. 40,149, to Dixcee, No. 64,504, to Beaujeu, No. 122,214, to Wehlan, No. 252,636, to Penfield, No. 122,851, and to Tiffany, No. 156,188; and by the British patent to Wright & Green issued in 1857. Other patents are also referred to as containing the elements, or some of them, which are employed in the Chambers combination. While I am satisfied that the several elements involved in this claimed combination had been previously exhibited in brick-making machines, including among them the device of the spring-controlled cut-off wire, in a crude and less perfect way than that of Chambers, still I am satisfied that this combination and more complete adjustment of these elements in an operative way, as shown by the combination of this seventh claim, was not anticipated. It is argued by the defendants' counsel that the brick machines which employed this combination were not altogether successful, and that defects appeared which induced Chambers to undertake and perfect improvements upon it; but this contention cannot be sustained for the purpose of defeating this claim. To do this it would be necessary to show that this combination was not operative and useful, which does not appear to be the fact. It is not sufficient to say that the invention was susceptible of improvement, and that, when improved, it would be more useful. The instances are numerous everywhere of patents which make but a start in the line of things new and useful, but which are valid notwithstanding many successive improvements are afterwards built upon them. My opinion is that this claim is valid.

Claim 9 of the Same Patent.

This combination is essentially the same as that of claim 7, except that the spring which controls the cut-off wires is limited to U-shaped elastic bows; the arms of the bows supporting the wires being in this case the springs also. The defense of anticipation made to this is substantially the same as that made to claim 7, with the addition of a reference to a German patent to Adrion, which is not more germane to the subject than those already enumerated. My opinion is that this claim is also valid.

Claim 22 of the Same Patent.

This combination includes not only the cut-off apparatus mentioned in claims 7 and 9, but includes also an off-bearing belt with mechanism to give it faster motion in order to quickly remove the brick after it has been cut off from the bar of clay. The defendants insist that the combination was also anticipated by a previous patent to Chambers, No. 40,221, and the Wright & Green British patent of 1857, already referred to. In my opinion, this claim 22 was not anticipated by the patents referred to, or by anything shown in the record, and is valid.

Claim 24 of the Same Patent.

This relates to a combination consisting of a propulsion belt on which the bar of clay is moved over pulleys and rollers past the cut-off and off-bearing belt, and a transfer roller located between these two belts, the function of which was to tilt the brick after it had been cut off, a little downward, where

it would be caught by the off-bearing belt, and be rapidly removed, without being marred on its under surface by dragging on an immovable fixture. Anticipation is pleaded also as to this, and in the proof reference is made to the Wise patent of 1862, which was for a machine for elevating cakes of ice. There was no element in the Wise patent designed for any such purpose as that of the Chambers roller, and the combination is not the same. Besides, if it was, I think there would be much ground for the suggestion that the transfer of that device to such a purpose as that of brickmaking, with the changes in the apparatus made necessary for such a transfer, would be evidence of invention and support the patent within the doctrine of the case of C. & A Potts & Co. v. Creager, 77 Fed. 454. This claim is held valid.

Claim 9 of Patent No. 297,917.

This claim covers a combination consisting of the elements of claim 7 of the previous patent just considered, No. 297,671, together with certain other elements, viz. the clay-expressing mechanism, the propulsion belt, and the adjustable frictional devices for conveying auxiliary motion to the propulsion belt. The defendants contend that this claim was anticipated by the Ainslie patent; the Nichols patent, No. 45,514; the Barr patent, No. 173,332; the Davis patent, No. 258,027; the Meyers patent, No. 97,955; and the Wright & Green patent, above mentioned. I have considered them all, and, while some of them exhibit in some form one or more of the elements of complainant's claim 9, now being considered, I am quite unable to find that any of them involve this combination as a whole, and certainly not in any practicable and useful way. This claim is also held valid.

Claim 10 of the Patent Last Mentioned.

This claim covers substantially the same elements as claim 9 of the same patent, but includes also a lever and some minor appliances for adjusting the friction of one of the belts employed. The defendants pleaded anticipation as to this claim, founding their defense on the same patents as those relied upon to anticipate claim 9. There will be the same ruling with reference to this claim as to claim 9. It is sustained.

Claim 11 of the Same Patent.

This claim is, in general, the same as claim 10, except that the lever mentioned in the tenth claim, used for regulating the friction belt, is constituted of two independent arms, adjustable with relation to each other. There is nothing new in the defense of anticipation, which is also raised to this claim, and the claim is therefore sustained.

Claim 7 of Patent No. 362,204.

In this patent there is a very important modification of the previous devices in the carrier of the spring-controlled cut-off wires. Theretofore this carrier consisted of an endless belt, to which the holders of the wire were secured, which holders were, as generally constructed, elastic, and served not only as supporting standards for the wires, but also as springs to hold them taut, or to yield when the wires should meet obstructions in cutting off bricks, these supports being in the form of a letter U, joined at the base to the endless belt. The improvement brought in by Mr. Chambers in patent No. 362,204 consisted in part of substituting for the endless belt as a carrier for the cut-off apparatus —and which, of course, was supported by a pulley inside of each end of it— a wheel upon the periphery of which the cut-off wires were fixed, and other mechanism was supplied for the purpose of so directing the cut-off wires as they should be carried down through the clay by the revolution of the wheel as to cut clean and straight across, making properly formed ends of the bricks. This claim was in the following words:

"In a brick machine of the class recited, the combination of a rotatable wheel journaled above the continuously moving bar of clay, the series of transverse cut-off wires fixed to the periphery of said wheel so as to successively cross the path of the clay bar as the wheel rotates, together with mechanism, substantially as shown, whereby said wheel is caused to rotate in the same direc-

tion as that of the movement of clay bar, and in unison therewith, so as to sever the bar into brick lengths, substantially as and for the purpose set forth."

The use of this combination has largely superseded that of the old endless belt carrier, and is the one which is now generally, although not exclusively, used in the construction of the Chambers brick machines. Later on I shall have occasion to go somewhat into the details of this new cut-off device embodied in the claim now being considered. The defendants set up in defense that this claim was anticipated by the Adamson patent, No. 106,448, by the French patents of Buzelin and Combe d'Alma and Dupin, and by the British patent of Wright & Green. I think none of these amount to an anticipation of this claim, and have no doubt of its validity.

Claim 9 of the Same Patent.

This claim relates to the construction of the cut-off wheel with its radial arms bearing U-shaped elastic bows secured to the periphery of the wheel, on which bows the cut-off wires are secured. This cut-off wheel in claim 9, with the detailed mechanism set forth, in the specifications and claimed in this claim, takes the place of the former belt carrier, and the devices associated with it, constituting the cut-off apparatus in the older patent. The same patents are set up as anticipations of this claim which were set up against claim 7, just considered. I hold that the patents referred to do not anticipate this claim, and that it is valid.

Claim 10 of the Same Patent.

This claim consists of a combination of a regulating belt, a cam engaging with a tappet wheel, the transverse cut-off wires, and a positively driven friction belt for driving the tappet wheel. The defense of anticipation of this claim is not, in my opinion, sustained, and the claim is held valid.

Claim 11 of the Same Patent.

This claim is for another combination of the elements involved in the cut-off apparatus employed in the new arrangement of devices in this patent. With other mechanism already stated, it includes devices for locking the spring-regulating arm of the pivoted tightener in the required position. Upon consideration of the same grounds and reasons as have been stated in reference to the question of anticipation, this claim should be held valid.

Claim 12 of the Same Patent.

This claim is also held valid on similar grounds.

Claim 29 of Patent No. 275,467.

This claim, I think, is invalid. It consists of a combination of a pulley frame with a scraper secured thereto, whereby, when the pulley frame is adjusted, the relative position of the scraper to the pulley will remain unchanged. The substance of this device, having regard to the prior art, is this: Prior to this contrivance, there had been organizations of a pulley with a scraper adjusted thereto, as Mr. Chambers admits; but in those cases the pulley was made adjustable upon the frame on which its axle was suspended, and the scraper was adjusted also upon the same frame. It is obvious that any change in the adjustment of the pulley would necessitate a readjustment of the scraper. Mr. Chambers substituted for the old fixed frame upon which the pulley and its axle were located a movable or swinging frame, which obviated the necessity for any adjustment of the pulley upon the frame. Then, when he came to locate its scraper to clean the pulley, it was perfectly obvious, as I should think, that the scraper should be located upon the frame as before, and the result would be that when once located its relation to the pulley would be constant. It is difficult to see how, with any reason, the scraper should be located anywhere else. The fixed relation of the scraper and pulley is the result simply of employing a movable frame for the pulley itself. There is nothing peculiar in the devices for changing the relation of the scraper to the pulley; nor, if there were, would the peculiarity of that element in the combination be susceptible of being claimed under a claim for this combination.

Claim 25 of Patent No. 297,671.

This claim consists of a combination with a scraper of deflecting wings for directing the material scraped from the periphery of the pulley so that it will fall beyond the belts. The substance of this combination is old; that is, it is the application of an old device to a new use, and is found in previous well-known constructions; such, for instance, as the double moldboard snowplows carried in front of engines to remove the snow from the track to points outside of it.

Claim 17 of Patent No. 297,917.

This claim is for a combination with off-bearing belt rollers of cap pieces covering the journals of the rollers, which extend over the ends of the latter, and beyond their bearings. I find nothing in this which deserves to be called invention. The business in which these rollers were employed would naturally suggest the propriety of protecting the journals from dirt, or chips of clay, or the like, and the construction of these caps is nothing more than any skilled mechanic would see the utility of. I feel very confident that there would have been really nothing new in this provision. The claim is held invalid.

Claim 18 of the Same Patent.

This claim adds to the combination of claim 17 minor pieces which receive the end thrusts of the journals. I have a strong impression that this also is not new, and, if it is, I do not think it amounts to invention. It is also held to be invalid.

Claim 19 of the Same Patent.

This claim consists of a combination with the rollers of longitudinally adjustable bearing strips, the cap pieces, and the corner pieces constructed as shown. This adds to the combination of claim 18 the important element of the longitudinally adjustable bearing strips. If the several elements co-act, it is probably patentable. I am unable to say with certainty that they do; and my impression is that there is room for thinking that this claim is of an aggregation of the bearing strips with the other elements in the alleged combination. But the patent office held the claim valid, and the contrary is not so clear as to justify an opposite conclusion. The result is that I hold this claim valid.

The foregoing claims all relate to those parts of the brick-making machine which deal with the bar of clay after it has been expressed through the die. The other claims to be considered relate to the structure of the tempering case, its inlet shafts and knives, and the die through which the clay is expressed. The first to be considered is:

Claim 2 of Patent No. 297,675.

This is for a combination of a screw with knives arranged on the shaft in the spiral manner shown, the first two knives being located with relation to each other and the screw, in the manner described. In this combination the first knife of the spiral is placed in the continuation of the spiral flange of the screw some distance beyond the latter; the second knife is located to the left and in advance of the end of the screw flange, about half way between the latter and the knife, 1, leaving a considerable lateral space between the second knife and the flange of the screw. The advantage claimed is that by this relative arrangement of the two knives with the rear end of the screw, sufficient space is left between the first knife and the opposite side or flange of the screw for the clay advanced by said knife to enter between it and the screw, and ample space is left between the second knife and the mouth of the screw for the body or furrow of clay advanced by the first and second knives to enter easily the mouth of the screw without undue packing or jamming of the clay, which it was said was a difficulty which had been encountered in previous constructions of this sort. This appears to me to be a device indicating invention; and, as nothing is shown which can be held to anticipate it, this claim is held valid.

Claim 3 of Chambers Patent, No. 207,343.

This claim consists of so arranging the inlet pipe to the tempering case a that it shall deliver the clay into the side of the case in which the tempering

knives are on the ascending part of their revolution. The object of this is to continually agitate and loosen the clay, and prevent its becoming packed, and obstructing the operation. The defendants plead in anticipation of this the Schlickeysen patent, No. 189,270. With considerable doubt and hesitation, I hold that, as the Schlickeysen machine shows the inlet on the ascending side of the revolution of the knives, although that was accidental merely, and not contemplated, the Chambers patent is, as to this claim, anticipated, and is invalid. This because it was not invention to seize upon a device already known and used for the same purpose (that is, as an inlet) in this identical art.

Claim 4 of the Same Patent.

This claim relates to the shaft carrying tempering knives arranged in a spiral line opposite in direction to that of the thread of the expressing screw. This is another device devised for the purpose of preventing undue accumulation and impacting of the clay in its progress through the tempering case. It seems to me that the substance of this combination was anticipated by the British patents to Oates of 1851 and 1852. In these patents there was the same arrangement of knives upon the shaft, with reference to the expressing screw, as that in the present combination; and the result of operating the machinery constructed under the Oates patents must be substantially the same as that produced in this Chambers combination. It may be that the advantage of so arranging the knives with reference to the screw was not fully understood, but the construction, the mode of operation, and the result are the same; and I do not think it was competent for a subsequent inventor to seize upon a device exhibited in a former patent, which it can be seen possessed a peculiar advantage, and adopt that as his own invention. This claim is accordingly held not valid.

Claim 6 of the Same Patent.

This claim consists of an expressing screw having its mouth set back from, and opposite to, the first tempering knife. This arrangement seems to have been the result of "cutting and trying," and it appears to me to be a close question whether it can be regarded as in the nature of an invention, or of mechanical skill applied to conditions which indicate the need. But upon giving effect to the presumption arising from the issue of the patent, I conclude the claim should be held valid. There is no anticipation shown which should, in my opinion, defeat it.

Claim 8 of the Same Patent.

This claim relates to the former and lining of the die, which are, in this instance, made in one piece. These were formerly made in two pieces. It is stated by counsel that the purpose of this so-called improvement was to provide a way for obviating the difficulties which were found to exist in practice resulting from the uneven wear of the two parts, by making the former and die lining in one homogeneous piece, so that they would wear away uniformly, and oblige the user to renew both the former and the die lining at the same time. I do not think there is anything which can be called invention in this, and hold the claim invalid. I say nothing about the alleged anticipations, though some of them seem to leave little or no standing room for this combining of the two parts into one by Chambers.

Claim 1 of Patent No. 275,467.

This claim consists of a former die having its top and bottom convex, and its sides straight or concave. It appears that in the prior art the sides only of the former die were made convex. The advantage of the new construction, giving convexity to the top and bottom, is said to be that the clay flows and expands into the corners of the edge of the brick more readily than when formed in the old way. This is another instance where a question of doubt is presented; whether that which was discovered is to be regarded as in the nature of invention, or, on the other hand, of supplying by mere mechanical skill the remedy which the result of the operation of the machine suggested. The patent office has held that it falls within the first class, and, as I find nothing in the record which anticipates it, it will be held valid. That shown

which comes nearest to anticipation is the Tecumseh die, so called. But this die was only employed at the exit of the clay for the purpose of dressing up its surface. It did not perform the office of a former, and therefore had no part in producing the effect which results from expressing the clay through a former as in the Chambers construction.

We come now to the question whether the defendants have infringed any, and, if any, what, claims of the complainants which are held valid. In taking up this question of infringement, the court is required to bear in mind, as has already been suggested, the invention of Mr. Chambers consisted of improvements upon structures of the kind to which his inventions relate. In other words, they were not, in general, broad inventions, which brought into the field originally those general organizations which lie at the foundation on which improvements are built. His inventions are of a widely-varying degree of merit, and to each should be attributed a domain corresponding to its originality. His claims are for combinations, and the elements which he employs to make them up must all be found to exist substantially in the defendants' machine in order to sustain the charge of infringement. In making comparisons between the Chambers machine and the one used by the defendants for the purpose of determining the question of infringement, I have assumed that the models of the two machines which were exhibited in operation at the hearing correctly represent the two machines; the argument having been made with reference principally to those models.

Claim 7 of Patent No. 297,671.

In my opinion, the defendants' machine does not infringe this claim. One large, and, as I think, sufficient, reason is that the movable carrier of the springs and cut-off wires of the defendants' machine is a very different structure from that of the complainant's. The defendants' carrier consists of a wheel whose radial arms support the cut-off springs and wires, while the complainant's is an endless belt running over two pulleys so adjusted that the cut-off wires attached to the under-running portion of the belt should enter the clay, and cut off the brick. Within the rules applicable to the case of inventions of this class, I do not think the defendants' construction is the equivalent of the complainant's in respect to the carrier. There are other points of difference, which I do not stop to consider. Those existing at the time of the making of this invention did not permit Mr. Chambers to claim broadly and generally any combination of the kind employed by him, and he was restricted to a combination of such elements as he described.

Claim 9 of the Same Patent.

The question of the infringement of this claim stands upon the same grounds as those considered in reference to claim 7. The combination is of fewer elements than those of the former claim, but it includes "the endless belt or carrier." It is, therefore, unnecessary to repeat what was said in reference to that feature. There are some limitations in claim 9 which would present other questions upon the point of infringement which it is not necessary to consider.

Claim 22 of the Same Patent.

This, also, upon a proper construction of its terms with reference to the specifications, involves the same endless carrier. For the reasons already stated, I think the defendants' carrier is such a widely different structure that it ought not to be held an equivalent.

Claim 24 of the Same Patent.

I think this claim is infringed by the defendants' machine. It is true that there is a modification of the independent transfer roller, in that it is grooved so as to receive the cut-off wire after it has cut off the brick, and passes along with the wire while it radiates past the former end of the moving bar of clay. This may be an improvement upon the Chambers device. I do not determine whether it is such; but, if so, it is but an improvement which does not essentially change the form and composition of the machine. It is easy to see that the Chambers plan underlies that of the defendants in this particular, and,

while the defendants' improvement may be patentable, I do not think it displaces the claim of the complainant.

Claim 9 of Patent No. 297,917.

This combination also includes the endless belt, or carrier, supporting the cut-off wires as one of the elements. For the reasons already mentioned, I do not think the defendants' machine infringes this claim. There is a new feature introduced into this claim, consisting of adjustable frictional devices conveying auxiliary motion to the propulsion belt, which presents a fresh ground for considering whether the defendants' machine infringes; but I do not pursue that matter.

Claim 10 of the Same Patent.

For the same reasons as given in reference to claim 9, just considered, it is held that this claim is not infringed.

Claim 11 of the Same Patent.

I have held this claim in the Chambers patent to be valid. Its language is this:

"The combination of the propulsion belt, the cut-off mechanism, the pulleys, p^8 and p^9, the idler, I, R, the friction belt, and the weighted pivoted lever, L, L', composed of two independent arms adjustable with relation to each other, substantially as and for the purpose described."

The cut-off mechanism, though made an element, is not described in this claim, and it was necessary, in order to sustain its validity, that the specifications should be referred to in order to show of what that element consisted. On carrying the specifications into the claim as descriptive of the cut-off mechanism, it makes up a combination which, as already shown, the defendants do not infringe.

Claim 7 of Patent No. 362,204.

I think the defendants' machine infringes this claim. Beyond doubt, this is the most important of all the claims in the complainant's patents.

The defendants' counsel, in his able and ingenious argument, contends that by the limitations imposed on the complainant's patent by his own specifications, and especially by the prior art, the invention should be restricted to substantially the same details of mechanism. There is nothing in the limitations, expressly or by fair implication, imposed by himself, which limits him to a strict construction of this claim. Nor do I think that the prior art put him in such stringent limitations as counsel assumes. This invention, although an improvement, was one of great merit, and a large advance upon anything which had gone before. The doctrine of Miller v. Manufacturing Co., 151 U. S. 205, 14 Sup. Ct. 310, is invoked to prove that where an invention relates to an improvement merely the inventor is restricted to the precise construction which he has detailed. But I take it that that doctrine is not absolute, and, when rightly construed and expounded, means this: that the rule applicable to the determination of equivalency depends upon the importance and the breadth of the original invention, and does not depend upon the question whether it was the first in the field relating to that subject, but upon the degree of advancement which the invention has made in newness of discovery and utility; for there may be as much merit in bringing on a large illumination from a feeble start as in the conception of the first beclouded idea which may have originated the course of study and discovery along that line. The rule is not a hard and fast one, but measures equivalents by looking to see what has been accomplished before, and finding whether the combination, read broadly, had been anticipated, or whether, having reference to what had already been shown, the claim must be limited to the precise construction in order to save it as being new; for the constant rule is to give to the inventor the benefit of all that he has invented. If he has improved only a little, he has only a correspondingly narrow standing ground. If he has improved much and widely, the arena of the field in which he is to be protected is enlarged to the limits of what his invention has made its own. A pertinent illustration of this is shown in the case of McCormick Harvesting Mach. Co. v.

Aultman, Miller & Co., 16 C. C. A. 259, 69 Fed. 371, where a very considerable and marked advance in invention in a machine already possessing faculties adapted in a measure for producing results somewhat similar was assigned a field corresponding to the extent of the new discovery. That invention was not "first in the line" of inventions relating to the subject, but it was held to be new, and found in a vital part of the machine, and extremely useful. In the present case I do not find anything in the crude and imperfect designs of the prior art to detract from this invention, or limit the inventor to the exact construction shown by his specifications. Looking at these two machines, and observing their mode of operation, one cannot fail to see that the scheme of the Chambers machine underlies that of the defendants. There are differences, it is true, and some of them may show that the defendants' has improvements, possibly such as would support a patent, but the general plan takes in the features of the Chambers combination. Counsel for the defendants contends that both were founded on the earlier art, and that each was entitled to the benefit of it as a starting point. But it appears to me that the more reasonable thing to say is that the Chambers machine rests upon the prior art, and that the Penfield is built upon that of Chambers. All the elements which exist in the one exist in the other. The functions of one are in some instances transferred to another, but the resultant conjoint operation is the same. And it may, in general, be said that the claim itself is a broad one, and does not tie the patentee down in respect of the details of the elements combined. It must be conceded that the conclusion which I reach in regard to the infringement of this claim rests upon the soundness of the original proposition which I have made in discussing this question,—that Chambers was entitled to a broad construction of his claim; that is to say, broad enough to render the particular form of his elements or exact mode of operation immaterial. On the other hand, if the prior art restricts his invention to the particular organization shown and the identical detail of operation, it would follow that the Penfield machine does not infringe this claim.

Claim 9 of the Same Patent.

This claim also, I think, is infringed by the defendants, for the reasons given in disposing of the same question in reference to claim 7.

Claims 10, 11, and 12 of the Same Patent.

With more doubt I hold that these claims are infringed. The doubt arises upon the fact that there is some room for saying that he has, by identification, particularly described one or more of the elements of these claims by reference letters, thus presenting the question whether such reference does in fact identify the particular element, or whether the reference is to be construed more largely, so as to cover any sort of an element of that kind which performs a like function in the operation of the combination. My impression is that the same rule of construction is to be applied as before, and that, for instance, the reference to the cam should be construed to mean anything in the form of a cam so constructed as to produce that effect in the operation of the machine which the device particularly shown does.

Claim 19 of Patent No. 297,917.

I do not think the infringement of this claim is made out of the proof. I put it in this way because the defendants do not use the longitudinal slot for making the adjustments. Apparently the receptacle for the screws is a hole, and while it is possible, as complainant's counsel suggests, that the holes might be made larger than the diameter of the screw, and thus give opportunity for some trifling adjustment, I do not think that on account of the mere possibility of thus fraudulently changing the character of the opening the machine, which does not indicate any purpose of such variation, should be held to infringe.

Claim 2 of Patent No. 297,675.

This claim is held to be infringed by the defendants. The only substantial difference between their own constructions and that of the Chambers combination consists in making the screw upon the end of the pugging shaft detach-

able, so that when the screw is in one position with reference to the shaft it is essentially the same structure as that of the complainant, while, if set the other way, it would be different. But, as it seems clear to me that when set in the right way to produce a useful result, it is substantially the same as that of Chambers, and that when set the other way it is comparatively useless, that difference of construction is only colorable. And so of the setting of the second knife on the opposite side of the shaft, which follows in the track of the first, and, so far as I can see, performs no useful function whatever. If it does, I think it must be regarded as only an improvement upon the Chambers invention.

Claim 6 of Patent No. 207,343.

The defendants have adopted the peculiar construction shown in this claim of the complainant's patent, and therefore infringe it.

Claim 1 of Patent No. 275,467.

There can be no doubt that the defendants infringe this claim also.
Let a decree be entered in conformity with these findings.

Statement by the Court.

This case involves the brickmaking art. There are several ways of making brick. We are here concerned with making brick by what are called "stiff-clay machines." An inventor of machines of this class is Cyrus Chambers, Jr., the president and chief stockholder in the complainant company, to which he has assigned all his patents. His patents Nos. 39,884 and 40,221 were issued to him in 1863. The process of making brick under these patents was as follows: The clay was dumped into a so-called "pugging mill," which was a partly cylindrical and partly conical or tapering receptacle, having a horizontal revolving shaft in its axial line. Upon the shaft were tempering knives to cut up the clay, and prevent laminations, and to press it forward into and between the threads or blades of the large end of a conical screw fixed upon the end of the shaft. By this means the clay was compressed, and forced into a so-called "former," with curved sides, which still further compressed the clay, and forced it into a rectangular die, from which it emerged in the form of a stiff clay column of the desired breadth and thickness of a brick. The column was delivered from the die onto an endless belt, later called a "propulsion belt" moving round two pulleys, one at each end, with friction rollers between. Beyond the propulsion belt, and extending in the same direction, was another belt of similar construction, upon which the bricks cut off from the clay column were carried to the point of delivery. This belt was, in later patents, called the "off-bearing belt." Between these two carrying belts, the ends of which were near to each other, was the cutting device. This device was a knife secured to a swinging cam, which was itself secured to a fly wheel. The fly wheel journaled in a shaft parallel to the carrying belt, revolved in a plane at right angles to the movement of the clay column, having its periphery at one point near the column. The knife, as the wheel revolved, was so fixed to the wheel as to cut through the clay column at each revolution of the wheel as the column was passing from the propulsion to the off-bearing belt. The shaft upon which the fly wheel was journaled was so geared and run as to make the shaft revolve a little faster than it took the column to move the length of a brick, but the fly wheel was fitted by a fric-

tion device but loosely to the shaft, and was made fast to another shaft, which was connected to and brought into unison with the movement of the propulsion belt and bar of clay thereon. In this way the fly wheel, though actuated by power independent of the propulsion belt, was restrained to revolve in unison with it, and made one revolution in exactly the time it took the clay column to move one brick length. The movement of the column was continuous. The cutting had to be done as the column moved, and yet the cut had to be straight, and at right angles to the direction in which the column moved, in order to make a square cut, and give the brick the required form of a parallelopipedon. This was accomplished by providing guides in which the knife was compelled to move, and an inclined plane, down which the frame of the guides was forced. By patents No. 45,974, issued in 1865, No. 104,705, issued in 1870, and No. 108,880, issued in 1870, Chambers made improvements in his brick machine, retaining, however, the same general form and the same cutting device. In 1878 he procured a patent for a brick machine (No. 207,343), in which, among other improvements upon his earlier machine, he included "a device for cutting the bar of clay into the desired lengths for bricks by means of a spiral blade and endless chain, with mechanism for regulating automatically the relation between the speed of the bar of clay and that of the cut-off device so that it shall be uniform under all conditions." He perfected this machine by devices for which he procured a patent (No. 275,467) in 1883. The spiral blade is driven by the same main driving shaft that drives the clay column. If the movements of the clay were uniform, the spiral blade and the clay column would thus move in exact unison, but such evenness of flow of the clay cannot be exactly sustained. When, therefore, the clay bar travels relatively faster than the blade, the bar presses against the blade, moving it forward, the oscillating movement being permitted by reason of the manner in which the shaft upon which the blade turns is supported. This, by means of a clutch device, increases the speed of the spiral blade. If the blade moves too fast, it will, by its reaction against the clay, screw itself back, loose the clutch, and reduce its speed. By letters patent No. 297,671, issued in 1884, Chambers disclosed another and improved mode of cutting the clay bar. This was an endless belt with elastic U-shaped bows fixed to its exterior surface and equidistant from each other, holding cut-off wires stretched from one end to the other of each U. The belt passed over a large and a small pulley, and was placed above the line of movement of the clay column. The belt was actuated through a cogwheel connection between the pulley about which the endless propulsion or clay-carrying belt moved, and the larger pulley of the cut-off belt; in other words, the clay column moved the cut-off mechanism, and this was the only source of power applied to the cut-off belt. The cut-off wires on the U-shaped bows were thus carried round on the endless belt at the same speed as the clay column, and, when they reached the lower side of the endless belt, in the same direction. The lower side of the endless belt was inclined downward from the smaller pulley to the larger in such a way that, as each wire and the

clay moved together towards the end of the propulsion or carrying belt, the wire was pressed more deeply into the clay column, and cut it through as the wire reached the end of the propulsion belt. This made a straight, square, vertical cut. In this patent he showed means for facilitating the delivery of the bricks, after they had been severed from the column, out of the way of the wire and the bricks behind by placing an idle roller in the space between the propulsion belt and the off-bearing belt. He ran the latter belt at a higher speed than the propulsion belt, and placed it at a lower level. The roller was on the level of the propulsion belt. Thus the brick, after it had passed half over the roller, would tilt forward onto the off-bearing belt, which, with its higher speed, would draw the brick quickly forward out of the way of the wire and the following brick. By patent No. 297,675, issued to him in 1884, Chambers disclosed an improvement in the arrangement of the tempering knives on the pugging shaft in their relation to the screw. By patent No. 297,917, issued in 1884, Chambers disclosed an improvement upon the endless belt cut-off to remedy a defect in his first device with such a cut-off, due to the fact that the clay was not always stiff enough to propel with uniformity both the belt upon which it was carried and the cut-off belt. He applied power from the main shaft by a friction belt to the forward pulley of the propulsion belt, and regulated the amount of auxiliary power thus supplied by passing his belting over an idle roller, which, journaled at the end of a lever with a weight upon its other end, exerted an adjustable pressure against the friction belt, and was the means of increasing or diminishing the auxiliary power thus furnished to the propulsion and cut-off belts.

The next patent to Chambers was numbered 362,204, and upon the claims of this patent arises the most important controversy at the bar, namely, as to the cut-off device. In this patent Chambers changes his cut-off device again. He takes the U-shaped holders and his cutting wires, and fixes them at equal intervals on the periphery of a circular reel, which he journals on the frame of the machine immediately over the end of the propulsion belt, and he then uses mechanism to regulate the relative motion of the reel and the forward, or, as he calls it, the "measuring," pulley of the propulsion belt, so that the curve described by each cutting wire as it strikes into the clay with the revolution of the reel will make a vertical, straight cut across the face of the clay column at every brick length. The defendant uses a reel with cutting wires fixed in the same kind of elastic holders journaled over the propulsion belt, which accomplishes the same result; and the question is whether, in doing so, the defendant does it in substantially the same way as Chambers, and within the claims of the latter's patent. The patentee thus describes his last improvement in cut-off devices in the specifications of patent No. 362,204:

"The next and fourth improvement, which I remark is the most radical and important, relates to the devices for and pertaining to the severing of the bar of clay into brick lengths, and is specifically an improvement upon the cut-off devices shown in my aforesaid letters patent No. 297,671, dated April 29, 1884. As will appear by reference to that patent, the bar of clay was cut off

by means of wires secured to elastic bows mounted equidistantly upon an inclined, endless belt, which, being driven by the mechanism therein described, carried said wires successively in continuous rotation gradually through the bar of clay, and severed the same at right angles into bricks. I found, after some experience, that this endless belt cut-off device, although practically successful, was in certain respects imperfect in its operation, and was otherwise objectionable, whereupon I was led to devise the construction which I shall now proceed to describe. This consists of a wheel or hub, G, Figs. 1, 8, 9, and 10, having equidistant radial arms, g', to the expanded free ends of which are bolted elastic steel bows, H, whose form and function are identical with those of the bows shown and described in my patent No. 297,671; that is, their form is U-shaped, with tapering sides, and their function to hold with a yielding tension the cut-off wires, w. This 'cut-off' wheel, as I term it, is secured to a stud shaft, g^2, journaled in a box, g^3, borne by a rigid standard, f^2, Figs. 1 and 9, that extends up from the frame, f, of the regulating belt. The position, laterally and vertically, of said cut-off wheel with relation to the advancing bar of clay, X (see Figs. 1, 10, and 12), is such that, as the wheel is rotated in the proper direction,—that of the arrow 1,—the wires, w, carried by the bows, H, will pass across the path of the clay bar, and also, at one point or stage of their movement, a short distance below the latter. As the motion of the bar of clay forced from the die in the end of the tempering case is forward in a straight line, while that of the cut-off is rotary across the path of the clay bar, and as, also, owing to the varying consistency of the clay, and other causes, the speed of the bar is not uniform, it is necessary, in the first place, to the production of perfectly rectangular bricks, that the rotary movement of the cut-off wheel shall be controlled or regulated so as to compel the cut-off wires, in traversing the bar of clay, to pass through the same at right angles; and, in the second place, it is requisite, in order to secure accurate results, that the rate of rotation of the cut-off wheel shall correspond with the speed of the bar of clay as the same shall vary. The means for securing these requirements are as follows, premising that the distance apart of the cut-off wires is greater than the length of the longest brick the particular machine is designed to make, or, to state it more precisely, greater than the length of a diagonal from the upper corner of one end of the track to the lower corner of the other end of the brick: The exact length of the brick to be made is measured by the pulley, F,—which I term the 'measuring pulley,'—at the forward end of the regulating belt frame, f, around which pulley, as previously stated, the said belt runs, and propels the pulley with a velocity in unison, so to say, with the advancing bar of clay resting upon the belt, the circumference of this pulley being the length of a brick, or a multiple of their length. In the present case it is equal to two brick lengths; hence this pulley makes half a revolution for each brick length. In calculating the proper diameter of said pulley, I allow for the thickness of the belt and the kind of belt. A four-ply rubber belt in bending over a pulley retains its normal length at the center,—that is to say, the half of the belt next the surface of the pulley upsets, while the outer half stretches,—so that half the thickness of the belt is to be added to the radius of the pulley, F, in calculating the circumference in order to secure exact length of bricks. In order to secure the first of the two requirements above recited,—that is, to insure a cut-off at right angles to the bar of clay,—I provide on the end of the shaft f^3 of the measuring pulley, a double heart-shaped cam, J, and on the shaft g^2 of the cut-off wheel I place a wheel, J' (which, for a purpose to be hereinafter mentioned, is also a belt wheel), with tappets, j^2, corresponding in number and relation to the cut-off wires on the wheel, G. As the shaft f^3 is turned by the bar of clay operating by its friction the regulating belt, the edge of the cam engages these tappets, whereby the course of the cut-off wheel is controlled, the cam, by its peculiar shape, governing the rate and course of movement of the cut-off, so that the wires can pass through the bar of clay only at right angles thereto, providing, of course, that it is desired to make rectangular or straight-edge bricks. If the ends of the bricks are to be of other configuration,—that is, 'ogees,' 'rounds,' or 'hollows,'—the shape of the cam must be varied accordingly. This cam, which runs within an oil-tight and dust-proof casing, T, is made quite heavy, so that it will serve both as a fly wheel to maintain uniform motion and as an anvil

to take up the blow of the somewhat irregular motion of the tappet wheel and its adjuncts, and thus relieve the bar of clay from unequal strains and the impact jars of the tappets. It will be understood that the cam does not drive the tappet wheel. It simply governs the necessary variability of its rotation. The tappet wheel is driven in the direction of the arrow, Figs. 1 and 10, so as to always hold the tappet sufficiently in contact with the edge of the cam by a friction belt, j^3, which passes around said wheel and around a tightener-pulley, j^4, and a grooved pulley, j^5, which latter is positively driven through suitable belt and gear connections (not shown in the drawings) intervening between it and the main source of power. The rate of motion thus imparted to the tappet wheel tends to exceed relatively that of the bar of clay, so that the tappets always have a bearing against the cam; and as the friction of the bar of clay upon the regulating belt, E, moves the latter and its pulley, F, as also the cam, J, and as the cam restrains and governs the course of the

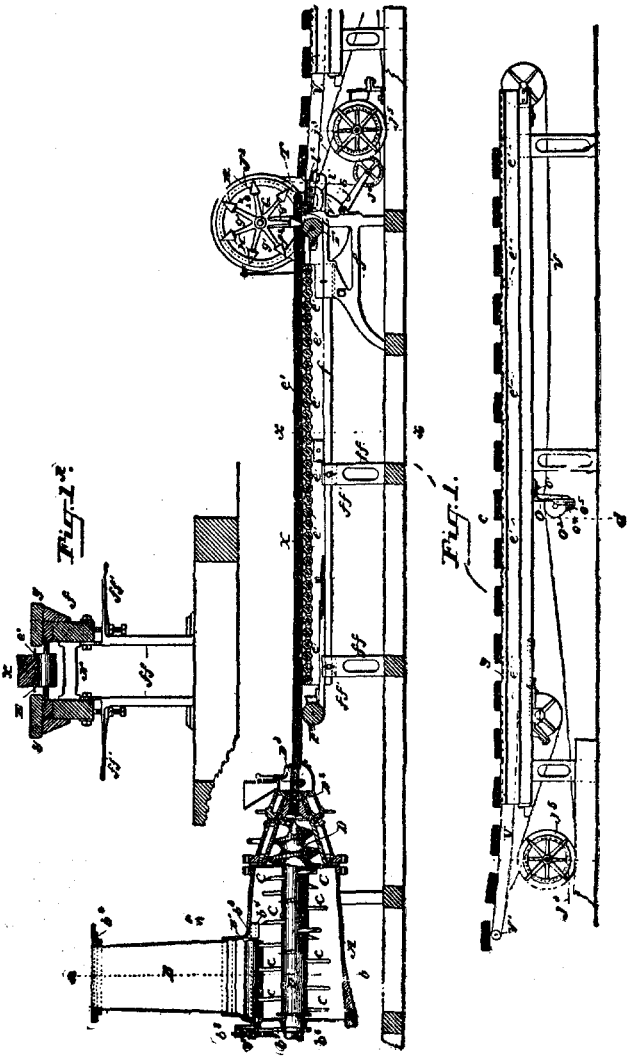
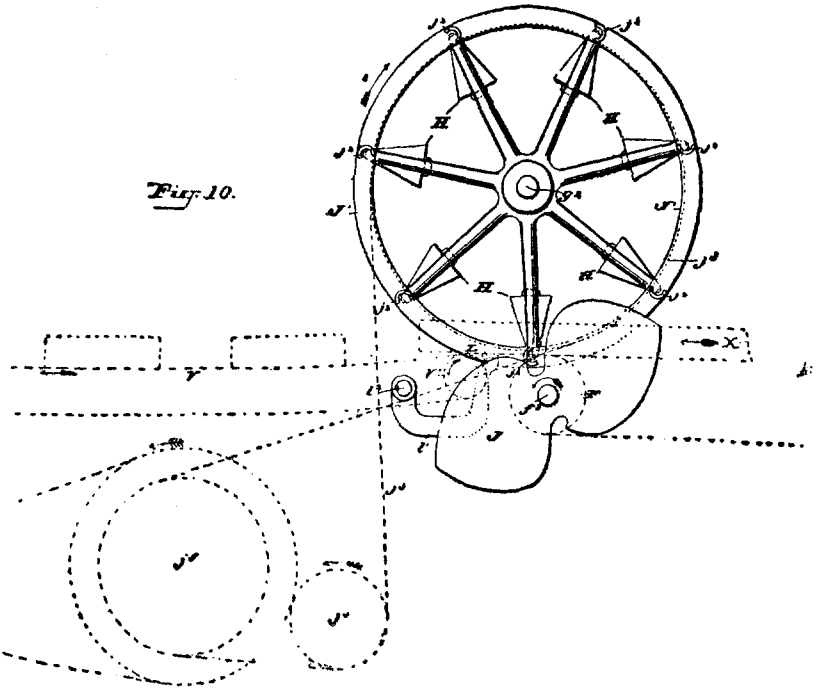


Fig. 10.



tappet, and consequently the cut-off wheel, the wires upon the latter must sever the bar of clay at right angles, whatever be the speed of the bar issuing from the die of the machine. As, owing to the difference in clays or the consistency of the clay, there frequently occurs a tendency of the friction belt to drive the tappet wheel with greater force than is really necessary (owing to the fact that the positively driven pulley, j^5, rotates more rapidly relatively than the bar of clay advances), I provide the frictional belt device above alluded to, and also means for regulating the same. These are as follows, particular reference being had to Figs. 1, 9, 10, and 11:

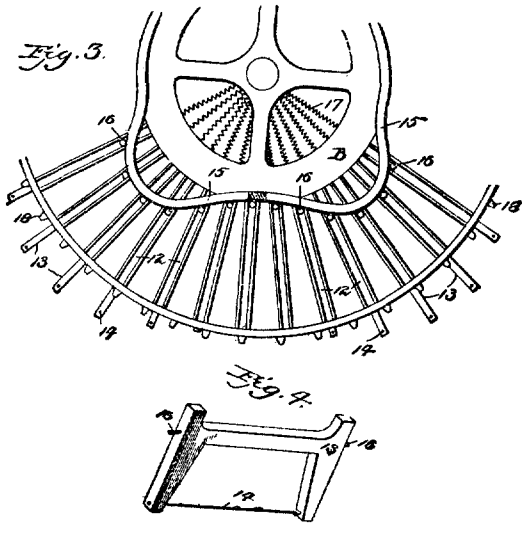
"As previously stated, the friction belt, j^3, passes around the tappet-wheel pulley, J', thence in contact with the tightener pulley, j^4, and around the driving pulley, j^5. The arm, j^6, of the frame, in which the shaft of the tightener pulley is journaled, is attached to a shaft, j^7, journaled transversely in the main frame. To a rearward projection of said arm is secured a spring lever, j^8, terminating in a handle piece, j^9, which bears against an upright segment, j^{10}, that is fastened to the foot of the frame. This piece has also attached thereto a spring finger, j^{11}, the end of which bears against the inside of the segment (see Fig. 8, sheet 4), and the latter is clamped between the piece j^9, and the said finger by means of a clamp screw, j^{12}, and thus the spring arm, j^8, is retained in the required position. The function of this spring arm is to allow for the small irregularities that may occur in the running of the belt,—such, for instance, as those caused by a piece of clay or stone getting under the belt. Other devices for retaining the spring arm in any desired position may be substituted for those described. The shaft of the tightener frame also carriers a hand lever, j^{13}, which is intended to be used when it is necessary for the operator to temporarily increase or diminish the friction, which is done by raising or depressing said lever, and, consequently, the tightener pulley. The elasticity of the arm, j^8, permits this to be done without freeing the same from the segment. I remark that the measuring pulley, with a circumference being a multiple of the bricks to be made, may be used in connection with other cut-off devices than those above described and referred to."

The defendant's machine is in almost every respect like the complainant's except in the operation of the cut-off wheel. The defendant uses a cut-off reel with bow-shaped elastic holders and wire cutters. It is geared by cogwheels with the forward pulley of the propulsion belt to run in unison therewith, and there is no double heart-shaped cam, nor are there tappets upon the reel intervening in the gearing connection between the reel and the pulley wheel, as in complainant's device. The defendant effects the variations of motion in the revolution of the cutting wires necessary to secure a straight vertical cut of the moving bar of clay in a somewhat different way. He does not fix his elastic holders and wires in the periphery of his reel, but he arranges each of them to slide in parallel radial slots cut in corresponding radial arms of the reel to and from the center or axis of the reel. He guides the in and out motion of these holders and cutting wires in the lower half of the revolution of the reel when the clay column is being cut by two fixed cams arranged opposite each other in the frame supporting the reel. Tappets on each elastic holder, as the reel brings it to the lower half of its revolution, are engaged against this cam, and so vary the distances of the wire from the center or axis of motion of the reel that the path of the wire through the clay is a plane at right angles to the plane of its motion, and it makes what is shortly called a "square cut." The device of defendant's is made under a patent (No. 478,436) issued to one Johnson in 1892, and for the sake of clearness it may be well to quote from the specifications and to refer to the drawings. The patentee says:

"B designates the cut-off wheel, which is of novel and particular construction, which I will now proceed to describe. On the side rails of the supporting-frame is secured a frame, B', in which bearings, 8, 9, are oppositely formed. These are preferably conical bearings to take in sockets 10 in the shaft 11 of the wheel, B. This wheel consists of two disks fixed on or extended from the shaft 11, and formed with radial slots, 12, in the disks or arms, as illustrated in Figs. 1 and 3 of the drawings. In these slots are arranged the ends of the cutting-wire frames, 13, disposed therein so as to readily and easily slide to and from the axis of the cutting wheel. These cutting-wire frames are made of a cross-piece having extended therefrom side-pieces, as seen in Fig. 4 of the drawings, between the ends of which the cutting wire, 14, is secured and stretched. To operate the cutting-wire frames so as to cut off the forms from the column of clay, I fix cams 15 to the frame, B', which cams are of the tread or form seen in the drawings Figs. 1 and 3, which cams, as the cutting wheel revolves, are engaged by studs 16 on the ends of the cutting-wire frames, and the frames thus forced downward as the clay moves outward and cuts the column into determined shapes or bricks. To prevent the wire-cutting frames from falling from the slots, and to hold the lugs or studs, 16, in contact with the tread of the cams, I attach retracting springs, 17, to the cross-bar of the wire-cutting frames, and fasten the other end to the shaft of the cutting wheel, as shown in the drawings. The cutting wheel, on its side rims, has formed sprockets, 18, which engage in sprocket holes, 19, on the edges of the belt 6, as indicated in Fig. 1 and shown in Fig. 2 of the drawings, and the cutting wheel thus synchronously moved with the column of clay and belt. Directly under the cutting wheel is journaled a roller, 20, arranged with the upper radial point on a line with the vertical cut of the wires, so that at this point the brick or form is entirely severed from the column. It will be observed from the foregoing description, in association with the drawings, that the cut of the wires is vertical or in a straight line across the form or column of clay, because the wire moves with the same movement forward in relation that the

column moves in progression, and that the wires are lifted from the column after severance, with the same result."

The following drawing illustrates the foregoing description:



The device of defendant's is not exactly like that shown above. The cam is of a somewhat different shape, and is a slot in which the tappet or knot on the elastic wireholder works. In defendant's machine, the cut-off receives auxiliary power from a positive-driven shaft geared to the propulsion belt pulley, which in turn receives auxiliary power by friction gear with the main shafting. It has a friction belt, arranged in every substantial respect like the friction belt by which auxiliary power is communicated to the cut-off wheel of the complainant. In the defendant's machine, as in complainant's, the clay column is delivered onto a propulsion belt, carrying the column to the cut-off wheel. The clay cut into bricks is then delivered onto an off-bearing belt, the speed of which is considerably greater than that of the propulsion belt. The propulsion belt runs round a pulley just beneath the cut-off wheel, which does not differ from the so-called "measuring" pulley of the complainant.

Wood & Boyd, for appellant.
Joshua Pusey, for appellee.

Before TAFT and LURTON, Circuit Judges, and CLARK, District Judge.

TAFT, Circuit Judge. We are much impressed, as the learned judge at the circuit was, with the development in the art of stiff-clay brickmaking, due to the inventive genius of Cyrus Chambers, Jr., the president and manager of the complainant, and the patentee of the patents sued on. But we are constrained to consider only the questions which have been brought before us on appeal. We cannot widen

our investigation to determine whether the defendant, in his machine, has appropriated any of the many devices, elements, or combinations of which Chambers or his assignee, under the numerous patents, may have a monopoly. In the bill and at the hearing below complainant sought an injunction and damages in respect of the infringement, future and past, of the claims of some four or five of complainant's patents. The judge at the circuit found many of these claims to be invalid, and sustained others. As to those which he found to be valid, he held that the defendant had not infringed a number of them. As to those invalid, or not infringed, he dismissed the bill, and no appeal has been taken from his decree. The sole questions presented to us, then, are as to the validity and infringement of the claims which the circuit court found to be valid and infringed.

The most important question presented in the case is that arising upon the alleged infringement of the seventh, ninth, tenth, eleventh, and twelfth claims of complainant's patent No. 362,204. These claims, the circuit court held, were valid, and infringed by Penfield's machine. These are combination claims to cover the rotatable reel cut-off device disclosed in that patent. This reel was simpler in construction than the endless belt and other means of cutting the end of the clay bar disclosed in Chambers' earlier patents, but its practical use involved the solution of a problem of mechanics that was not free from difficulty. If the cutting wires were fixed to the periphery of the cut-off reel with a fixed axis, then the actual path in space described by each wire must be a cylindrical surface with the axis of the reel as its axis or center line. To make the resultant of the union of this circular movement of the wire and the continuous rectilineal movement of the clay bar, a vertical plane at right angles to the direction of the clay bar was a problem of relative motion which could only be solved by giving to the wires variable speed in relation to the speed of the clay bar. In previous patents Chambers had produced complete unison of motion between the clay bar and the cutting wires of the endless belt, which moved in a straight course at an acute angle to the clay bar, by gearing the propulsion belt and the cut-off wheels together with cogwheels. When he adopted his circular reel, however, while preserving a correspondence between the motion of the propulsion belt and the cut-off wheel, to secure proper brick lengths, he must make the motion of the latter vary in speed, in relation to the propulsion belt and clay bar. Instead of the cog gearing, he substituted a rotatable two-winged cam, which, while it was so geared as to revolve in complete unison with the motion of the propulsion belt and clay bar, variably interfered with and regulated the revolution of the cut-off wheel, and thus secured the necessary variable speed of the cutting wires on its periphery. The only serious question is whether Penfield's machine infringes. We have not the slightest doubt that this improvement involved the exercise of the inventive faculty in a high degree, and that the claims which cover it are valid. We shall refer to the prior art in considering the issue of infringement. It is enough now to say that there is nothing in it which destroys the novelty of Chambers' device for making a circular cut-off reel effect a square

cut. Penfield solved the same problem that Chambers had solved, not only by varying the relative speed of his cutting wires through the clay bar, as Chambers had done, but also by varying from the circular the actual path of each cutting wire through space. He unfixed the wires from the periphery, and imparted to each a capacity for radial movement in and out from the axis of the reel. The extent and variation of this radial movement he controlled by a cam or slot in the frame of the reel, in which the wires engaged as they progressed through the clay bar. As the distance of each wire from the axis diminished or increased, its speed through the clay bar necessarily diminished or increased. The motion of the clay bar and that of the periphery of the cut-off wheel in Penfield's machine are as nearly in unison as cog gearing can make them. He secures the needed variability in relative motion of the wires and the clay bar by varying the relative motion of the periphery of the cut-off wheel and the cutting wires. Chambers, on the other hand, secures this by varying the relative motion of the clay bar and the cut-off wheel.

Claim No. 7 of the patent No. 362,204 reads as follows:

"In a brick machine of the class recited, the combination of the rotatable wheel journaled above the continuously moving bar of clay, the series of transverse cut-off wires fixed to the periphery of said wheel, so as to successively cross the path of the clay bar as the wheel rotates, together with mechanism, substantially as shown, whereby said wheel is caused to rotate in the same direction as that of the movement of clay bar, and in unison therewith, so as to sever the bar into brick lengths, substantially as and for the purpose set forth."

Does Penfield's machine infringe this claim? Penfield certainly uses a rotatable wheel journaled above the continuously moving bar of clay. He has a series of transverse cut-off wires, but they are not "fixed to the periphery of said wheel." He combines these elements so that the wires successively cross the path of the clay bar as the wheel rotates. He uses mechanism whereby said wheel is caused to rotate in the same direction as that of the movement of the clay bar, and in unison therewith, so as to sever the bar into brick lengths. Is this mechanism substantially the same mechanism as that shown in the Chambers patent? The mechanism and all its parts are substantially the same, save in the substitution, for the rotatable cam and the wires fixed in the periphery of the reel, of the radially moving cutting wires and the fixed cam in the frame of the reel. Are these equivalents? If they are to be so regarded, then the defendant's machine infringes. The more meritorious the invention, the greater the step in the art, the less the suggestion of the improvement in the prior art, the more liberal are the courts in applying in favor of the patentee the doctrine of equivalents. The narrower the line between the faculty exercised in inventing a device and mechanical skill, the stricter are the courts in rejecting the claim of equivalents by the patentee in respect of alleged infringements. In order to determine the merit of this invention, and the advance in the art effected by it, we must examine the prior art, including the previous inventions of Chambers himself. As early as 1863 he had invented the general form of the present machine with its pug mill, the tempering knives, the former and the die, the delivery of the clay

bar upon an endless belt, later called the "propulsion belt," the cut-off at the end of the propulsion belt, and the second belt for removing the cut bricks, later called the "off-bearing" belt. In the patent No. 297,917, not yet expired, he had adopted an endless belt, to which he fixed his elastic bows holding the cutting wires. This endless belt was moved round pulleys journaled above the continuously moving bar of clay. The propulsion belt and the endless belt were geared together by cogwheels to run in unison, so that the clay should be severed into brick lengths. The endless belt and the propulsion belt received auxiliary power from the main shaft of the machine by means of a friction belt, and the power thus received was regulated by an idler roller held against the belt by a weighted lever. The invention of Chambers covered by the seventh claim of patent No. 362,204 was the substitution of a circular reel for the endless chain in the combination disclosed in his patent No. 297,917. This was not a fundamental step in the art. The endless-chain machine of Chambers was a successful machine, and, while the circular reel machine is a better one, it does not appear from the record that it has worked a revolution in the trade. The use of a reel cut-off had been twice suggested in the prior art, and, while the devices do not appear, for other reasons, to have been successful, they showed a mode of regulating the motion of the circular reel which would effect a straight cut through the bar of clay. The devices are disclosed in two French patents; one issued to Buzelin in 1876, and the other to Combe d'Alma in 1872. In these patents the belt carrying the clay column is armed with a series of upright projections serving as cams that engage tappets projected from the periphery of the cut-off wheel, which is journaled over the moving bar of clay; and these cams or projections propel the cut-off wires through the moving clay bar at the necessary speed to make the square or angular cut. The pressure of the upright cam against the tappet of the revolving cutting wire keeps the tappet constantly in contact with the vertical face of the cam as the wires move downward through the clay bar. The cam is constantly at right angles to the direction of the clay column, and moving with it. The cutting wires thus are made to take the same direction. Before Chambers applied for his latest patent, though not before he had conceived his invention, and constructed machines in accordance with it, one Frey built an operative and practical machine on the principle of the French machines.

It was thus suggested in the art, when Chambers began his solution of the problem, that the way to produce the variation in motion between the cutting wires of the reel and the clay bar needed to secure a straight cut was by a cam to control the motion of the wires. The cam shown was a movable cam, moving with the clay bar, and operated directly on the cutting wire. Chambers conceived and invented a movable cam revolving in unison with the movement of the clay bar between the belt carrying the clay bar and the cut-off wheel. Penfield made his cam stationary, and introduced it where it could vary the relative motion of the reel and its cut-off wires. After careful study of the three devices, it seems to us that the inventor of Penfield's device has taken a different way of solving the

problem of variable relative motion from that shown in the French patents or in Chambers'. It is true that the Chambers invention showed that it could be accomplished by a movable cam. But this had certainly been suggested by the French patents before Chambers'. We cannot say that the problem would not itself suggest the use of a cam somewhere in the mechanism to insure variable motion, but the question was, where and how? In spite of the suggestion of an upright movable cam fixed to the propulsion belt in the French patents, it clearly involved invention on Chambers' part to shape his movable cam revolving in unison with the progression of the clay bar, and to put it where he did put it. But we are unable to see that the inventor of Penfield's device derived any more aid from Chambers' movable cam than from the cam of the French patents. Indeed, the similarity between the French solution of the problem and Penfield's is much closer than that between Chambers' and Penfield's. The unfixing of the cutting wires and giving them radial motion were entirely new, and no suggestion of it can be found in either of the prior patents. It is said by counsel for complainant to be a general principle in mechanics "that the motion, or resultant of motion, imparted to a working tool or device by means of a rotating or moving cam can be secured by a fixed cam upon which or against which the device or tool or its connections to be moved work or run; the two cams being substantially of the same form as to working surface, the one, as stated, being movable, and the other fixed"; and that the inventor of Penfield's machine merely applied this principle to create the difference between that machine and Chambers', and so the two must be equivalent in the sense of the patent law. It is true that, where a mechanical result is obtained by the movement of one element upon another element of a combination, it does not usually involve invention merely to reverse the operation, and secure the same result by making the first element stationary and the second movable. And so, where resultant motion is secured by a stationary cam guiding a tool, it may often be an obvious change to reverse the parts by making the cam movable and the tool stationary. But the question whether it is obvious is to be determined by examination of the particular machine in which the change is made. Here the difficulty of inserting a cam anywhere in the machine to secure correct motion was such that we think the principle relied on could have but little application in any case, and it certainly does not apply to the change which the inventor of Penfield's machine made. He does not confine himself in the change to a cam to produce variable speed in the revolving wires, but he varied the actual path of the wires themselves from that of a circle. So far as reel cut-off mechanism is concerned, Chambers and the inventor of Penfield's cut-off pursued different paths from the prior art to reach the same result. The advantage in using cut-off reels was suggested in the prior art. We cannot hold that Penfield's device for regulating his cut-off reel is tributary to Chambers'. We do not decide, because it is not before us for decision, whether Penfield's machine, as organized, does not include all the elements of *combinations* claimed in earlier patents to Chambers. The only

question here is whether, with the prior art, including all that had been disclosed before the issue of patent No. 362,204, as well that which Chambers himself had shown in previous patents as that shown by other inventors, the combination of a reel cut-off with Penfield's mechanism to make a straight cut of the clay in brick length was substantially the same as Chambers'. If the idea of the use of a reel for such a purpose was entirely new, and if the cam principle of variable motion by which it was made to discharge its function had never been suggested before in such a case, it might very well be that the use of a reel by a subsequent inventor for the same purpose, with a cam introduced into another part of the machine, even if it required the inventive faculty to make the change, would nevertheless be an invention tributary to the first, and therefore an infringement. As already pointed out, however, such is not the case here. The conclusion that Penfield's machine does not infringe the seventh claim of patent No. 362,204 carries with it as a necessary corollary that the other claims of the same patent, the ninth, tenth, eleventh, and twelfth, are not infringed, because the charge of infringement as to each can rest only on the predicate that the radially moving cutting wires and fixed cam of the Penfield machine are the equivalent of the cutting wires fixed in the periphery of the reel and the two-winged rotatable cam of the patent.

The next question presented by the assignments of error is whether Penfield's machine infringes claim 24 of Chambers' patent No. 297,671. That claim is as follows:

"In combination with the propulsion belt and the off-bearing belt running over pulleys respectively in suitable frames, the independent transfer roller, I, located with relation to said belts, substantially as and for the purpose described."

The specifications and drawings show this roller to be located between the propulsion belt and the off-bearing belt. It is an idle roller, and receives power and motion from nothing except the moving brick as it is being severed, or immediately thereafter. Its operation is described by the patentee as follows:

"As the bar of clay, C, perforce advances, its free end, nearly severed, is received by and upon an independent transverse roller, I, which performs an important function, soon to appear. It will be seen, by looking at Figs. 1 and 2, that this roller is journaled at the end of the propulsion belt frame, F, Fig. 1; that it is placed nearer to the pulley, P^2, at the end of the off-bearing belt frame, F^2, than to pulley, P', and that it is elevated a little above the line of the off-bearing belt; that is to say, in the same horizontal plane with the propulsion belt. Until the end of the clay bar is entirely cut off to form a brick, it advances on to roller, I, its free end extending over and above the off-bearing belt; but, by reason of the stated relative position of that roller at the moment or shortly after the severance of the bar is completed, the center of gravity of the brick, Br, passes beyond the supporting line of the roller, and the brick tilts over upon the rapidly moving off-bearing belt, the said roller then freely adapting itself to the increased speed acquired by the brick. In order to prevent the wire, which has just done its working, and is moving on its way to repeat it in its turn, from striking the under side of the brick as the belt carries it (the wire) on and upward over the pulley P^3, I make the latter of relatively large diameter, so that the brick will have ample time to get out of the way before the wire can interfere with it. As the belt quickly turns the wire over the pulley P^3, it will readily be understood that the wire cannot be struck by the end of the clay bar behind."

In Penfield's machine a roller is placed between the propulsion belt and off-bearing belt, so that its upper surface is on a level with the former, and a little higher than the latter. The roller is placed relatively a little nearer to the propulsion belt than in Chambers' machine, so that the cutting wire of the reel, in its movement after the severance of the brick, would strike against the roller, and be obstructed by it. To obviate this difficulty, a groove is cut in the face of the roller from end to end. The revolving wire enters this groove, and leaves it without contact with the roller. In order that the wire shall always register with this groove, the roller is geared by cog gearing to the shaft of the propulsion belt, and moves in unison therewith. The roller in the Penfield machine receives the severed brick, carries it on towards the off-bearing belt, onto which it tilts, and is drawn out of the way of the severing wire by that more rapidly moving belt. The wire does not enter the groove until after the brick has passed onto the off-bearing belt. The only real difference between the two rollers is that the Penfield roller is not so efficient as the Chambers roller for the purpose for which they are both designed, to wit, that of assisting the brick onto the off-bearing belt out of the way of the severing wire in its upward return. The Chambers roller, because it is an idle roller, after the brick tilts onto the off-bearing belt, takes the higher speed of that belt, and the brick moves more quickly, and without friction on the roller. The Penfield roller tilts the brick out of the way of the wire like the Chambers roller, but, because of its being driven positively by the propulsion belt, cannot take the higher speed of the off-bearing belt, and the latter, after it receives the brick, must, as it draws the brick more rapidly, cause some friction between the brick and the roller. Just why the designer of the Penfield machine found it necessary to put the roller so near to the propulsion belt as to make necessary the recess in the surface of the roller and the gearing of the roller with the propulsion belt does not clearly appear; but, whatever the cause, it is certain that this change does not prevent the Penfield roller, in combination with the two belts, from being an infringement of the Chambers roller in the same combination. An infringer cannot evade liability for his infringement by deliberately diminishing its utility without changing materially its form, its chief function, or its manner of operation. Sewing-Mach. Co. v. Frame, 24 Fed. 596.

It is, however, contended that it did not involve invention on Chambers' part to combine the roller with the two belts for his purpose. Counsel say that "the use of an idle roller to assist in transferring articles from one thing to another is as old as the art of endless carriers," and they cite a patent to Wise for an ice elevator consisting of two endless belts positively driven over rollers with the space or gap between them occupied by two rollers which are also positively driven. They also cite an English patent for a brick machine, issued to Porter in 1855, in which, after the brick is cut, it is pushed onto a more rapidly running roller, and thus out of the way of the next brick. While the inventive faculty required to devise the combination of the roller with the propulsion belt and the off-bearing belt in Chambers' machine may not have been of as high order as

that shown in other of his devices in this and other patents, we are nevertheless of opinion that it was invention. The necessity for preventing the wire from overtaking and injuring the rear end of a brick in the upward and return swing of the wire called for some remedy. An idle roller placed anywhere between the belts would not have done it. The roller must be so placed with reference to the two belts that the brick, after moving onto the roller, would tilt forward, lifting its rear end out of the way of the oncoming wire. This was accomplished by placing the off-bearing belt below the level of the propulsion belt and fixing the roller on a level with the propulsion belt. Neither the problem nor the solution of it is suggested in the Wise or the Porter patent. We conclude that the twenty-fourth claim of patent No. 297,671 is valid, and is infringed.

The next issue arises upon claim No. 6 of Chambers' patent No. 207,343, and claim No. 2 of patent No. 297,675. The first claim reads as follows:

"The expressing screw, S, having its mouth set a little back from, and opposite to, the first tempering knife, in the manner and for the purpose specified."

Patent 207,343 was for one of the improved brick machines of Chambers. The improvements over earlier forms were many in the pugging shaft, the screw, the cut-off, and in other parts. The chief improvement, as Chambers testifies, was in the arrangement of the tempering knives upon the pugging shaft, whereby the tempering of the clay, and its delivery through the screw and die in a column, was made more efficient, and at very much less expenditure of power. He says in his specifications:

"The pugging shaft, P, is provided with a series of tempering knives, K, K, arranged spirally around it on a curve running in the opposite direction to that of the spiral of the screw, S, which is attached to the forward end of the shaft, and presses the tempered clay out through the die, as hereinafter explained. This arrangement of the knives obviates the tendency they would have if placed on the same spiral as the screw to drive the clay into the screw case, and compress it there, and produce clogging, and an unnecessary density. Less power is consequently required to drive the tempering knives, the function of each knife being merely to plow the clay over into the space left vacant by its predecessor, thus giving each knife a very narrow strip of clay to operate upon, and relieving it from sustaining the backward thrust of the entire mass of clay moving in front of it. * * * It is important that the mouth of the screw should be arranged relatively to the tempering knives, that the clay should be allowed to pass freely without clogging between the knives and the base of the screw. The spiral of the screw being opposite in direction to that of the line of knives, the two form at their point of junction the ends of a right and left handed thread, which would bring the second tempering knife from the screw end of the shaft so close to the thread of the screw as to cause the clay to lodge between them. By placing the mouth of the screw opposite to, and a little back of, the first knife, said knife will feed the clay over into the cavity and between the thread of the expressing screw, and the second one into the path of the first, and the third knife be sufficiently far from the screw to allow the clay to pass freely between them."

The second claim of patent No. 297,675 is as follows:

"In combination with the screw and the knives arranged on the shaft in the manner shown, the first two knives, located with relation to each other and the screw as and for the purpose specified."

The patent was for an improvement on the arrangement of knives shown in patent No. 207,343, in which their arrangement in a spiral reverse to that of the screw was generally maintained, but more space was secured between knives located in the same longitudinal line on the shaft. The patentee says:

"Referring now to Figure 1, it will be seen that the knife marked '1'—that is, the first knife of the spiral—is placed on a continuation of the spiral flange of the screw, S, some distance beyond the latter; also, that the knife 2 is located to the left, and in advance, of the end of the screw flange, about half way between the latter and knife 1, and that a considerable lateral space is left between said knife 2 and the screw. By this relative arrangement of these two knives and the rear end of the screw, sufficient space is left between the first knife and the opposite side or flange of the screw for the clay advanced by said knives to enter between it and the screw, and ample space is left between the second knife and the mouth of the screw for the body or furrow of clay advanced by both the first and second knives to easily enter the mouth of the screw without undue packing or jamming of the clay."

In speaking of the sixth claim of patent No. 207,343, Judge Severens, at the circuit, said:

"This claim consists of an expressing screw having its mouth set back from, and opposite to, the first tempering knife. This arrangement seems to have been the result of 'cutting and trying,' and it appears to me to be a close question whether it can be regarded as in the nature of invention or of mechanical skill applied to conditions which indicate the need. But upon giving effect to the presumption arising from the issue of the patent, I conclude the claim should be held valid."

The most important feature in the arrangement of knives in patent No. 207,343 was making the spiral in which they were set reverse to that of the expressing screw. It was this which so greatly reduced the expenditure of power needed to force the clay through the tempering chamber into the screw. Had this been a novel conception, we should have regarded it as certainly involving the inventive faculty; but the court below found that the claims covering this improvement were invalid, because such an arrangement had been shown before in the art. This finding has not been appealed from, and in the present hearing we must accept it as a basis for action upon the other claims. The question, therefore, is whether, in adjusting the two spirals at their junction, it involved anything but mechanical skill to place the mouth of the screw in relation to the first and second tempering knives so that the clay would not clog between the thread or blade of the screw and the second knife. It was a mere matter of distance between the screw blade and the second knife, and the change of position of the expressing screw by turning it on its axis would seem to have been an obvious means of varying this distance. It seems to us that it was a mere matter of simple experiment by one familiar with the operation of the machine, and did not rise to the dignity of invention. The slightly different adjustment of the first and second knives with respect to the mouth of the screw in patent No. 297,675 is, in our opinion, equally lacking in patentable invention. We must therefore find the two claims to be invalid.

The remaining issue on this appeal is that made upon claim No. 1 of patent No. 275,467 to Chambers. The claim is:

"The former die, M, having its top and bottom convex, and its sides straight *or concave.*"

The former die, it will be understood, is the chamber into which the clay is forced by the expressing screw, and from which it emerges in the form of a column of stiff clay onto the propulsion belt, to be cut into brick lengths. The patentee says in the specifications of the former die that:

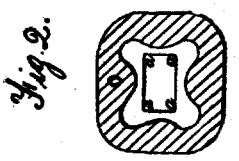
"The improvement consists in making the top and bottom of the former die convex, and its sides straight or more or less concave, * * * instead of, as heretofore, making the sides of the same convex. The new form, I find by experience, is a great improvement upon the old ones, as the body of clay, which is retarded in the middle by the convexity of the former die at the top and bottom, is better spread out laterally, and the clay more forcibly packed in the corners, than was the case when the sides of the former die were convex."

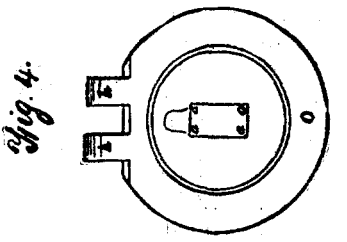
It is not denied that the defendant uses just such a former die as that described and claimed in this patent, but it is contended that such a former die is shown in the prior art, and that it lacks novelty. Here is, as the learned judge at the circuit said, "another instance where a question of doubt is presented,—whether that which was discovered is to be regarded as in the nature of invention, or, on the other hand, of supplying by mere mechanical skill the remedy which the result of the operation of the machine suggested." In 1863 Chambers took out a patent for a former die having both the top and bottom and the sides convex. In explaining the defect he was attempting to remedy, he said:

"It will be obvious upon reflection that the ordinary operation of a plunger or other propelling device in a machine with the ordinary form of die is to produce the greatest amount of velocity in the center of the mass, giving the outer edges and surfaces less, and hence rendering them more liable to be made ragged and broken by partial adhesion to the die while passing through it. The velocity being less, the density is also less of these outer portions; in other words, the quantity of matter in a given space is greater at the center than at the surface of the exuded bar of clay. The remedy for this is to be sought in a reversal of the ordinary disposition of the material, forcing the greatest amount of clay into the corners of the brick or tile, and compressing it there so that the last action of the die upon it will be to give it smoothness, instead of tearing it, and rendering it rough and ragged. The peculiar form of my dies completely effects this object."

He then describes the die:

"The cross section of this die is at its inner end circular and at its outer end rectangular, as seen in Figure 4. A cross section on a line (midway between) is shown in Figure 2.





"In this figure we see the angles or corners rounded out or grooved, and these grooves gradually tapering till they disappear altogether at the angles, a, a, of the rectangular opening of the die. These grooves constitute the main peculiarity of the invention, their object and effect being to crowd a

greater quantity of clay into the angles of the bar of clay as it passes through the die, so as to give them greater solidity and firmness, in accordance with the views hereinbefore stated."

The only change which the patentee made in the die of patent No. 275,467 was to remove the convexity of the sides, and substitute either straight or concave sides. This was merely a modification of the earlier former in degree, and not in principle. In the earlier Kells patent a former die is shown with its sides convexed and its top and bottom straight. It is true that the convexity is carried into the die itself so as to make the bricks of concave sides. But the convexity of the sides is said by the patentee to be adopted for the purpose of securing sharp corners, a purpose quite similar to that of Chambers in the device under consideration. On the whole, we are constrained to deny validity to this claim.

The decree of the circuit court is affirmed as to claim No. 24 of patent No. 297,671, and is reversed as to claims Nos. 7, 9, 10, 11, and 12 of patent No. 362,204 on the ground of noninfringement; and as to claim No. 2 of patent No. 297,675, claim No. 6 of patent No. 207,343 and claim No. 1 of patent No. 275,467 on the ground that the claims are invalid for want of patentable invention; and the case is remanded to the circuit court, with directions to dismiss the bill as to all the claims here involved except No. 24 of patent No. 297,671. The costs of the appeal will be taxed one-fourth to the appellant and three-fourths to the appellee.

HART & HEGEMAN MFG. CO. v. ANCHOR ELECTRIC CO. et al.

(Circuit Court of Appeals, First Circuit. March 13, 1899.)

No. 238.

1. PATENTS—REISSUES—VALIDITY.
   Where a reissue is granted to correct an error of a single word in the specifications, as by changing "hole" to "slot," and a corresponding change is made in a single feature of one of the numerous figures in the drawing, but no change is made or needed in the claim, there is no reason for holding the reissue invalid.
2. SAME—INFRINGEMENT—ELECTRIC SWITCHES.
   The only difference between a patented electric switch and an alleged infringing switch was that in the former the catch was released by a movement radially inward, while in the latter the release was by a movement radially outward, and the former was operated by a flat spring, one end of which was attached to a stud depending from a spring plate, while the latter was operated by a spiral spring, the corresponding end of which was attached either to a small cap at the top of the hub just beneath the operating handle, or was fastened by being cast through the hub itself, the cap in that case being omitted. *Held*, that these variations involved merely the use of mechanical equivalents, and the patent was infringed.
3. SAME.
   The Hart reissue, No. 11,395 (original No. 459,706), for an electric snap switch, construed, and *held* not anticipated, valid, and infringed.

Appeal from the Circuit Court of the United States for the District of Massachusetts.

This was a suit in equity by the Hart & Hegeman Manufacturing Company against the Anchor Electric Company and its officers for alleged infringement of a patent for an electric snap switch. The circuit court held that the patent must be construed narrowly, and consequently was not infringed. 82 Fed. 911. The complainant thereupon appealed to this court.

Charles E. Mitchell and Henry B. Brownell, for appellant.
Edward P. Payson, for appellees.

Before COLT, Circuit Judge, and BROWN and LOWELL, District Judges.

LOWELL, District Judge. This was a bill in equity brought for the infringement of reissued latters patent No. 11,395, granted to Gerald W. Hart, December 12, 1893, for electric snap switches. The alleged infringing switch was made in accordance with the description of letters patent No. 547,149, granted to Norman Marshall, October 1, 1895. To the complainant's patent the defendants have raised objections, both formal and substantial.

As the patent in suit shows two specific constructions, the defendants contend that the complainant must be limited to one of these. Both constructions, however, are embodiments of the same inventive idea, and both are sufficiently covered by the claim. Hart's original patent taken out for the invention in question was No. 459,706. The reissue was granted to correct the error of a single word in the specification (by changing "hole" to "slot"), and a corresponding modification was made in a single feature of one of the 11 figures illustrating that patent. The error was caused by oversight, and was unconnected with the gist of the invention, though its adoption rendered the machine inoperative. No change was made or needed in the claim. If the patentee made a meritorious invention, he ought not to lose the benefit of it by reason of a defect so narrow and technical. See Walk. Pat. § 218a.

We pass to the substantial objections made by the defendants to the maintenance of this suit. The only claim of the reissue is as follows:

"The herein-described snap switch, consisting of a stop plate having stopping shoulders, a central hub, an operating handle, an eccentric moving with said hub, a switch plate, a spring plate, a spring, and a catch operated by said eccentric for releasing and stopping the switch plate, substantially as described, and for the purpose specified."

It is obvious that none of the elements set forth in the claim are new. The invention, if any, must be found in the combination of these elements. Again, it was not new in the art to make electric snap switches. Plainly, none of those made prior to Hart's invention were so satisfactory in their operation as to check the demand for improvement, or the patenting of machines devised to secure it. An examination of some of the many patents and machines introduced in evidence in this case suggests the cause of the failure of the earlier devices,—a failure sometimes complete and sometimes partial. The machines made under the patent in suit have gone into large general use, though there is no evidence that the plaintiff has monopolized the

manufacture of positively operating electric snap switches. Hart's combination of stop plate, hub with rigidly connected eccentric operating radially, spring, and catch, seems to us to contain important novelty. Certainly his invention was not primary, but we think that it was of value, unless anticipated in the prior art.

To show anticipation, the defendants have introduced in evidence many patents. We need mention but a few of these; for, if no one of those mentioned anticipated the complainant's invention, there was no anticipation in any of those passed over. The Bourne British patent, No. 15,617, resembles Hart's in little except the presence of a spring and eccentric. It has no stop plate, no locking against backward movement, no certainty of operation. Its switch plate is operated directly by the eccentric, and not indirectly, as are the switch plates of both complainant and defendants. It is a far cruder machine than Hart's or the defendants', though one of the same general class. Between it and Hart's we think there was meritorious and considerable invention; yet upon the anticipation alleged to be found in the Bourne device the defendants very largely rely.

The Norton patent, No. 430,252, contains no eccentric, strictly speaking, and its catch moves vertically, not radially. These differences, and others of less importance, give it a mode of operation quite unlike that of the patent in suit. No. 376,976, issued to Bergmann, is a reciprocating switch. Its operation is altogether different from Hart's, and its resemblance to the latter quite remote.

The Davis patent, No. 476,613, comes closer to the complainant's device. The complainant has introduced considerable direct evidence that his invention was made before that of Davis, though the latter was first applied for. This evidence was not shaken on cross-examination, and there is nothing to control it. It is true that evidence of prior invention, unsustained by proceedings to obtain a patent, is properly regarded with suspicion, but in this case we are inclined to find it sufficient. Even if, however, the Davis invention be taken to be prior to that of Hart, we think it does not anticipate Hart's switch. The Davis switch has no eccentric, properly so called, and its operation is materially different. It may be true that an imaginable combination of the Bourne and Davis patents would closely resemble the patent in suit, but such a combination is not obvious, and would require patentable invention.

Defendants rely also upon Hart's prior patent, No. 447,728. There is uncontrolled evidence that the switch described in the patent in suit was first invented and first reduced to practice. In any case, it was invented before the issue of No. 447,728. That patent, therefore, is not in the prior art, properly so called, and has priority only as a prior patent issued to the same inventor. We think that it is not so nearly identical with the patent in suit as to deprive the latter of real and useful novelty. The earlier Hart patent has no eccentric, properly so called, and no radially moving catch, and its stop plate, if there be one, is very different from that of the patent in suit. The entire operation of the mechanism is different. It may be added that the difference between some of the patents above mentioned, such as those of Bergmann and Davis, and the patent in suit, appears more

plainly when all are embodied in actual machines than when the specifications, drawings, and claims alone are examined.

It seems to us, then, that the patent in suit represents a valuable and useful, though limited, invention. If it be really valuable, we think there can be little doubt that it is infringed by the defendants' machine. The only differences between the two machines are: (1) The defendants' catch is released by a movement radially outward, while in the patent in suit the releasing movement is radially inward. In this respect, the two devices are plainly the mechanical equivalents, the one of the other. (2) The patent in suit is operated by a flat spring, one end of which is attached to a stud depending from a spring plate. The defendants' switch is operated by a spiral spring, the corresponding end of which is attached either to a small cap at the top of the hub and just beneath the operating handle, or is fastened by being passed through the hub itself, the cap in that case being omitted. That the spiral spring is the equivalent of the flat spring is clear, and it is equally clear that the defendants' cap in which the end of the spring is inserted is the mechanical equivalent of the complainant's spring plate and depending stud. It cannot help the defendants that in some of their machines the end of the spring is thrust through the hub itself instead of thrust into the cap. In considerable degree this is recognized, even by their expert, Mr. Freeman, who testified:

"If the Hart claim covers any equivalent of the spring plate, then the number of elements in the defendants' switches would be the same as the number of elements of complainant's switch broadly stated in the claim of complainant's patent. So too, broadly stated, the general mode of operation of defendants' switches is substantially the same as the general mode of operation of complainant's switches."

The learned judge in the circuit court seems to have been of the same opinion, for he says:

"Moreover, if the court was able to ascertain that the complainant's device was of a broad character, indicating a substantial advance in the art, it might be justified in holding that, although the spring plate is omitted in the respondents' device, yet inasmuch as, taken as a whole, it has what is equivalent to the complainant's device as a whole, including the substance of it, the complainant's patent should, therefore, be construed liberally and broadly, so that any infringement might be prevented if found."

As our examination of the prior art has led us to the opinion that the complainant's device did indicate a substantial advance in the art, it follows that the Hart claim does cover a mechanical equivalent of its spring plate. The difference between the two switches seems to us to be merely that which usually distinguishes an infringing machine from that which it infringes. Nonpatentability, rather than noninfringement, is the substantial defense to the action. The defendant corporation was therefore liable.

Two minor questions arise in dealing with the case. The defendants' answer alleged that the complainant had made or sold his switches without marking them or the packages containing them "Patented," and without notifying the defendants of any alleged infringement. In Sessions v. Romadka, 145 U. S. 29, 49, 12 Sup. Ct. 799, 805, a similar objection was raised, but the court said:

"Although there is the averment in the answer that the defendants have no knowledge or information, save from said bill of complaint, whether the packages were marked with the word 'Patented,' etc., and therefore deny the same, there is no denial of their knowledge that the Taylor device was patented; and in view of the fact that all letters patent are recorded, with their specifications, in the patent office,—a record which is notice to all the world,—it is not an unreasonable requirement that the defendant who relies upon the want of knowledge on his part of the actual existence of the patent should aver the same in his answer, that the plaintiff may be duly advised of the defense."

This objection of the defendants is therefore unfounded.

Some of the defendants further contend that, even if the defendant corporation should be enjoined in this case, no injunction should issue against the other defendants, its officers. Entirely apart from the question of the liability of an officer of a corporation for damages caused by infringements committed by him on behalf of the corporation, there can be no doubt that in a case like this the officers of the corporation may be enjoined from further infringement.

The decree of the circuit court is reversed, and the case is remanded to that court for further proceedings in conformity with this opinion, the appellant to recover its costs in this court.

LOEWENBACH v. HAKE-STIRN CO. et al.

(Circuit Court of Appeals, Seventh Circuit. February 23, 1899.)

No. 527.

PATENTS—INVENTION—RECEIPT AND RECORD BOOKS.

The Loewenbach patent, No. 390,087, for a combination, in a carbon copying receipt and record book, of series of permanent and detachable leaves bound together, each of the former having a portion of its edge cut off so as to expose part of the leaf below, if not covering a mere aggregation, is void, in view of the prior state of the art, for want of patentable invention.

Appeal from the Circuit Court of the United States for the Eastern District of Wisconsin.

This was a suit in equity by Hugo Loewenbach against the Hake-Stirn Company and others for alleged infringement of a patent for improvement in receipt and record books. The circuit court dismissed the bill, and the complainant appealed.

J. B. Erwin, for appellant.

Before WOODS, JENKINS, and GROSSCUP, Circuit Judges.

PER CURIAM. This appeal is from a decree dismissing a bill for an injunction against infringement of the fourth claim of letters patent No. 390,087, granted on September 25, 1888, to Hugo Loewenbach, for improvements in receipt and record books. The claim reads as follows:

"In a carbon-copying receipt and record book, the combination of series of permanent and detachable leaves bound together, each of the former having a portion of its edge cut off or out, so as to expose part of the leaf below, substantially as and for the purpose set forth."