Cordesman, cited above, "it is the inventor's province to make his own claim, and his privilege to restrict it. If it be a claim to a combination, and be restricted to specified elements, all must be regarded as material, leaving open only the question whether an omitted part is supplied by an equivalent device or instrumentality." Although the mere fact that the claims of the Muller patent are expressed by reference to particular parts of his drawings and specifications, this would not necessarily confine and limit him to the literal mode of construction described and exhibited, and deprive him of the benefits of the doctrine of equivalents. If his invention is of a broad and meritorious character, such as to work a decided advance in the art, it will require something more than the use of reference letters in his claims to limit him to the exact form of device he has described. This question was fully considered, and the views entertained by this court announced, in the case of the McCormick Harvesting Mach. Co. v. C. Aultman & Co., 37 U. S. App. 299–343, 16 C. C. A. 259, and 69 Fed. 371. The doctrine of the cases of Weir v. Morden, 125 U. S. 98, 8 Sup. Ct. 869, and Hendy v. Iron Works, 127 U. S. 370, 8 Sup. Ct. 1275, is, as we think, applicable only to mere improvements on well-known devices,—a doctrine which is therefore applicable to the case in hand. Upon the evidence in this case concerning the earlier devices employed publicly for more than two years, it is clear that Muller's invention is a mere improvement of a narrow character upon well-known devices for accomplishing the same purpose. To avoid the defense of anticipation it is necessary that this patent be limited to the precise device which he has described and claimed by reference letters. He is therefore not entitled to a liberal application of the doctrine of equivalents which he invokes in this case. Miller v. Manufacturing Co., 151 U. S. 186, 207, 14 Sup. Ct. 310; Wright v. Yuengling, 155 U. S. 47, 15 Sup. Ct. 1; Wells v. Curtis, 31 U. S. App. 123, 13 C. C. A. 494, and 66 Fed. 318. This patent, thus construed and limited, is not infringed by the device of the defendants. They do not use the screw, G, nor the nuts H or H'. The decree of the circuit court must therefore be affirmed.

STANDARD CARTRIDGE CO. et al. v. PETERS CARTRIDGE CO.[1]

(Circuit Court of Appeals, Sixth Circuit. December 8, 1896.)

No. 398.

1. PATENTS—INTERFERENCE PROCEEDINGS—PROCEEDINGS UNDER REV. ST. § 4915—BURDEN OF PROOF.
   In proceedings, under Rev. St. § 4915, by a defeated contestant in interference proceedings to establish a right to a patent, the decision of the patent office on the question of priority is to be taken as presumptively correct, and the burden is on the complainant to establish his case by testimony of a character which carries thorough conviction. 69 Fed. 408, affirmed. Morgan v. Daniels, 14 Sup. Ct. 772, 153 U. S. 120, followed.
2. SAME—PRIORITY OF CONCEPTION—REDUCTION TO PRACTICE.
   If, in such proceedings, it appear that the complainant was the first to conceive the idea of the invention, and to give it such substantial expression as that, without further exercise of inventive faculty, one familiar with the

[1] Rehearing denied February 8, 1897.

art could construct a machine embodying the invention, and that he disclosed the same to the defendant, who appropriated the idea, it is then immaterial that defendant made the first machine, and filed the first application. Complainant's neglect to push his conception to completion, and promptly file an application, cannot avail the defendant under such circumstances.

3. SAME—WHAT CONSTITUTES INVENTION.
The mere existence of an intellectual notion that a certain thing could be done, and, if done, might be of practical utility, does not furnish a basis for a patent, or estop others from developing practically the same idea.

4. SAME—PRIORITY OF INVENTION—REDUCTION TO PRACTICE.
If ineffectual efforts are made to give an idea form, through drawings, models, or machines, but are abandoned before reaching such a stage of completion as to require only mechanical skill to carry the conception to success, the claim of priority cannot be sustained against a later independent conception, carried into practical form at an earlier date.

5. SAME—BURDEN OF PROOF—DRAWINGS, ETC.
The burden is on the second reducer to practice to show prior conception by him, and to establish the connection between that conception and his reduction to practice by proof of due diligence. That burden may be met by the exhibition of drawings, and by oral explanations antedating the first reduction to practice by another.

6. SAME—DATE OF DRAWINGS.
If a person who is the first to conceive the idea of an improvement on an old form of machine, by sketches, shows so clearly the novel features of his improvement that one familiar with the old machines could construct one embodying the improvement, without the exercise of any inventive faculty, then such inventor is entitled, on a question of priority, to carry back the date of his invention to the date of the drawings. That the drawings do not in all respects show the relation of the novel features to the old machine, nor precisely describe the mode of attachment, is not fatal, if the absent features are such as would be readily supplied by a mechanic familiar with the subject.

7. SAME—CARTRIDGE LOADING MACHINES.
In proceedings under Rev. St. § 4915, to reverse the action of the patent office in interference proceedings, *held*, on the evidence, giving due weight to the presumption of the correctness of the patent office decision, that George Ligowsky was the first and original inventor of the improvement in cartridge loading machinery, described and claimed in patent No. 464,883, issued to him in consequence of such decision.

Appeal from the Circuit Court of the United States for the Western Division of the Southern District of Ohio.

This is a bill in equity, filed under section 4915, Rev. St. U. S. It involves a question of priority of invention between Charles S. Hisey, who has assigned his invention to the complainant the Standard Cartridge Company, and George Ligowsky, who has assigned the same invention to the Peters Cartridge Company. Hisey first constructed an organized machine, embodying the invention now in controversy, and first filed an application for a patent thereon. Before the patent office had acted upon the matter, Ligowsky filed his application for a patent upon the same novel improvements claimed by Hisey. An interference was declared upon certain claims embraced in each application. The issues upon this interference were as follows: "First. In a cartridge loading machine, the combination, with shell loading devices, of an endless belt, band, or carrier suitably actuated, said belt, band, or carrier being provided with shell cases secured thereto, and projecting therefrom. Second. In a cartridge loading machine, the combination, with an endless belt, band, or carrier provided with shell cases secured thereto, and projecting therefrom, of loading and ejective devices arranged and located over, above, and in line with said endless belt, band, or carrier, and mechanism for giving the carrier intermittent motion, and for operating the loading and ejecting devices. Third. In a cartridge loading machine, the combination, with an endless belt, band, or carrier provided with shell cases secured thereto, and projecting therefrom, of a shell delivery device located in

the path of the carrier." Much evidence was taken upon the questions of priority thus put in issue. The examiner of interferences decided the issues in favor of Ligowsky. Upon an appeal to the examiner in chief, the decision of the examiner of interferences was reversed, and priority awarded to Hisey. From this an appeal was taken to the commissioner, who again awarded priority of invention to Ligowsky, and reversed the decision of the examiner in chief. In accordance with this judgment, a patent was issued to Ligowsky's assignee, the Peters Cartridge Company. That patent is dated December 8, 1891, and is numbered 464,883. To reverse this action of the department, and to have Charles S. Hisey declared the only and first inventor of the improvements patented to the assignee of Ligowsky, is the object of this suit. The entire record upon the interference issue in the patent office, together with the opinions filed upon the several and independent hearings accorded upon the interference issues, was, by stipulation, filed in the circuit court, and made part of the record. Both parties took additional evidence, and, upon a record thus made up of more than 3,300 printed pages, the cause was heard in the court below by the Honorable George R. Sage, district judge, who again awarded priority of invention to Ligowsky. In an opinion found in the transcript sent to this court, that able and experienced patent judge said: "The opinion of this court, after having heard the arguments of counsel, examined their briefs and the record, and considered the whole case, is that, independently of the rule as to the burden of proof, the decision of the commissioner of patents is right, that Ligowsky was the inventor, and that the attempt of Hisey to appropriate the invention was fraudulent." 69 Fed. 408. In accordance with this conclusion, the bill of the complainants was dismissed. From this decree an appeal has been perfected, and errors assigned.

Robert H. Parkinson for appellants.

Frank T. Brown, for appellee.

Before TAFT and LURTON, Circuit Judges, and HAMMOND, J.

Having made the foregoing statement of facts, the opinion of the court was delivered by LURTON, Circuit Judge:

Though the issue is one of priority of invention between Charles S. Hisey and George Ligowsky, its solution under this proceeding does not depend upon the mere preponderance of evidence. That department of government charged with the duty of originally hearing and determining questions of priority arising under conflicting applications of inventors has, upon evidence and full consideration, determined the controversy between those parties against the contention of the present complainants, and awarded a patent to the assignee of George Ligowsky. But for the provision made by congress, and found in section 4915 of the Revised Statutes, the conclusion of the executive department of government, that Hisey was not entitled to a patent upon improvements which he claims to have invented in cartridge loading machines, would be fatal to his claim. The statute referred to is the sole foundation for the jurisdiction now invoked. In considering the weight to be attached to the action of the patent office in a like case, where there had been an interference issue between rival claimants of the same invention, the supreme court said:

"It is an application to the court to set aside the action of one of the executive departments of the government. The one charged with the administration of the patent system had finished its investigations, and made its determination, with respect to the question of priority of invention. That determination gave to the defendant the exclusive rights of a patentee. A new proceeding is instituted in the courts,—a proceeding to set aside the conclusions reached by the administrative department, and to give to the plaintiff the rights there awarded

to the defendant. It is something in the nature of a suit to set aside a judgment, and, as such, is not to be sustained by a mere preponderance of evidence. * * * Upon principle and authority, therefore, it must be laid down as a rule that, where the question decided in the patent office is one between contesting parties as to priority of invention, the decision there made must be accepted as controlling upon that question of fact in any subsequent suit between the same parties, unless the contrary is established by testimony which in character and amount carries thorough conviction." Morgan v. Daniels, 153 U. S. 124, 125, 14 Sup. Ct. 773.

Tested by this rule, have the complainants made such a case as to justify this court in canceling the patent issued to Ligowski's assignee, and requiring one to be issued to Hisey instead?

Machines for automatically loading cartridge shells with powder, wads, and shot had been long known in the art before either Hisey or Ligowsky claim to have made the improvements now in controversy. Many patents for such cartridge loading machines have been filed in this record, to illustrate the history of the art before the attention of either was attracted to such machines. In most of these patents, cartridge shells were loaded with powder, shot, and wads automatically, and then ejected from the machine. In most, if not all, of them, to which attention has been particularly called, the carrier conveying the empty shell to the different loading tools traversed a circular path. The location of the loading tools necessarily conformed to the structure of the shell carrier, and were therefore arranged in a cluster. The circular arrangement of the loading tools, and the circular character of the table or disk carrying the empty shells to the loading tools in proper succession, characterized all of the machines of the old art, and are therefore known as "round table machines." The radical point of departure from this old round table type of machine, covered by the conflicting claims put in issue by the interference proceeding, lies in the substitution of an endless belt, band, or carrier, suitably actuated, and provided with shell cases secured thereto, and projecting therefrom, for the old round table disk carrier of the old type of machine. The change from a rigid disk carrier, traversing a circular path, to an endless belt carrier, moving in a straight line, made necessary a readjustment of the location of the loading tools, and their arrangement in a straight line above the belt shell carrier, as well as the adaptation of a device for delivering the shells properly located in the path of the carrier. This substitution of an endless belt shell carrier, properly actuated, for the old round table carrier, and the necessary relocation and proper adaptation of the loading tools and other devices already known to the art to the new form of carrier, constituted the real substance of the improvements on the old machines described in the interference issues.

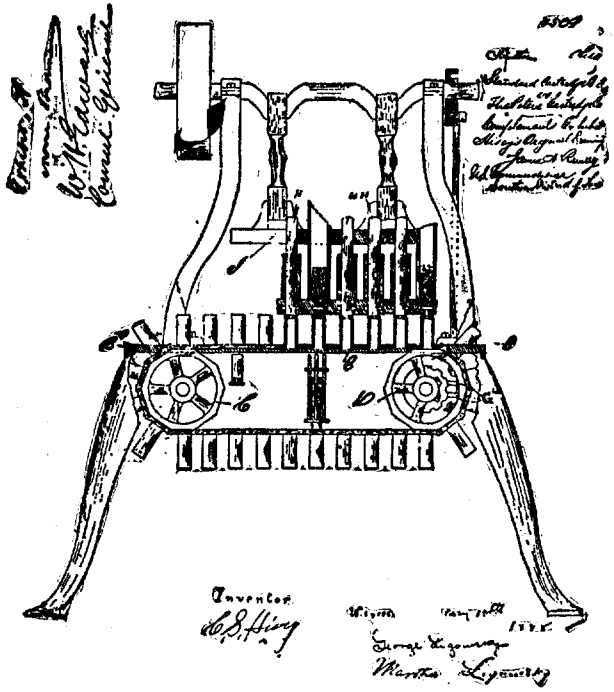
The case for Hisey, as the first and sole inventor of these improvements on the old type of machine, is substantially this:

First. That, during the summer and fall of 1887, he had been engaged in overhauling and truing up two round table machines for the Peters Cartridge Company, and in constructing two other

machines, of the round table type, for the same company. He claimed that he made many improvements in the mechanism of these machines, which claim, as we shall hereafter see, became subsequently the subject of another interference contest between himself and G. M. Peters, of the Peters Cartridge Company, the issues in that contest being finally decided against him. He says that the knowledge thus acquired of the clumsiness and slowness of these old round table machines led him to thinking, and that in the month of April, 1888, the idea of an endless chain carrier occurred to him, being suggested by "observing a bicycle go by that had an endless chain to transmit the power." He says he followed the thought up by experiment with a chain "on a prismatic disk, * * * to view its motion." He then says: "After determining in my own mind that I could make it work, I made a drawing showing the connections as they occurred to me, having its tools on a table above the chain, and in line with the chain, and showing a device for intermittently moving the chain."

Second. The drawing mentioned is produced and filed, and bears date May 10, 1888. It is signed by Hisey, as inventor, and by George Ligowsky and Martha Ligowsky, as witnesses. The word "Inventor," above the signature of Hisey, was written by George Ligowsky, and the word "Witness," above the signatures of George

262. Complainants' Exhibit.



COMPLAINANTS' EXHIBIT HISEY'S ORIGINAL DRAWING.

Ligowsky and Martha Ligowsky, is also in the handwriting of George Ligowsky. As to the authenticity of this original Hisey drawing, there is no dispute.

Third. That in August, 1889, complete detailed working drawings were made, and an organized machine shortly thereafter constructed.

Fourth. That September 8, 1889, an application was filed in the patent office for a patent upon these improvements, applied to a cartridge loading machine for loading bullet cartridges; and on June 24, 1889, he filed a second application for the same novel features applied to a machine for loading cartridges with shot.

Fifth. That photographs of the organized machine constructed in the summer and fall of 1888, at Berlin, Germany, by Hisey, or under his plans and direction, were sent from Berlin, in January, 1889, by one Armin Tenner, for whom the machine was built, to George Ligowsky, at Cincinnati.

Sixth. Between the date of Hisey's original drawing, May 10, 1888, and his arrival in Berlin, in June, 1888, where he went to construct certain cartridge loading machines for Armin Tenner, it is shown that he exhibited a section of endless chain and his original drawing to several persons, and claimed the machine shown in the drawing as his invention.

This summary of the evidence favorable to Hisey's claim is met upon the other side as follows:

First. By the testimony of George Ligowsky that while Hisey was working on the Peters Cartridge Company's round table machines, in the shops of the Cincinnati Screw & Tap Company, he (Ligowsky) was having built by the same company a certain automatic irrigating machine, of his own invention, and upon which he subsequently took out a patent; that this work took him frequently to the shops, and there his attention was attracted to the cartridge loading machines upon which Hisey was working; that in that way he and Hisey first met each other, and soon became intimate; that being a machinist, and of an inventive turn of mind, and the inventor of a number of mechanical devices, he became interested in the mechanism of these machines; this was during the summer and early fall of 1887; that his study of these round table machines led him to the conception of the novel features of the improvements forming the subject-matter of controversy between himself and Hisey; that during August and September, 1887, he produced seven sketches showing the endless belt carrier, and a mode of adaptation to the old loading tools and other devices; and that during the year 1887 he disclosed these novel improvements to others, and exhibited to them some or all of his said seven sketches, and explained his ideas. These seven sketches are produced and filed. Most of them bear date in August or September, 1887, in the handwriting of Ligowsky. Among those persons to whom he disclosed his invention and exhibited his sketches, he includes the complainant Hisey. He says he fully explained his conception to Hisey by aid of his sketches, and by chalk drawings made in the shop with the old Peters ma-

chines present. He states that Hisey did not think the old round table carrier could be improved upon, and thought an endless chain carrier too liable to derangement by wear, and too flimsy an affair for a mechanical movement. He further says that Hisey subsequently suggested an improvement upon the driving mechanism by which the tool carrier and endless chain would be driven from below instead of from above the table, and embodied this proposed change in location of driving mechanism in the sketch of May 10, 1888, above referred to. Hisey very flatly denies these statements, so far as they affect him, and a sharp question of veracity is to be settled. The same issue of fact arose upon the proceedings in the patent office, and was decided by the examiner of interferences in favor of the truth of Ligowsky's story. The examiner in chief, upon appeal, thought the weight of evidence with Hisey; but the commissioner of patents, on final appeal, agreed with the examiner of interferences, and held that Ligowsky had drawn the sketches exhibited at the time claimed, and disclosed his invention fully to others, including Hisey. The latter, in his opinion filed with the interference record, says:

"If there be in the case a material allegation of fact resting upon oral evidence, which is better supported by proof than any other, it is that, during the year 1887, Ligowsky produced seven sketches, showing the novel parts of the improvements in controversy, and during that year made disclosures of those novel features to others. As to whether Ligowsky during that year disclosed his conception to Hisey, he said, in view of the admitted intimacy of these men and their association at the shops where these Peters machines were being constructed, that 'the strong natural probabilities in the case, taken with the amount of positive testimony on the point, compel it to be found as matter of fact that prior to April, 1888, Ligowsky disclosed the invention to Hisey.'"

Some additional evidence bearing upon this issue of fact has been added to the evidence since the patent office decision. This new evidence is merely cumulative, though the new proof on the whole tends to add somewhat to the case for Ligowsky. That Ligowsky did, during the year 1887, disclose his invention to others, and did exhibit to others some or all of the sketches now filed, is testified to by no less than 14 witnesses, who have in no way been effectively impeached. That Hisey was one of the persons to whom such disclosures were made, or was present when they were made to others, is likewise testified to by substantially the same witnesses. Whatever criticism may be made as to unreliability of the memory of some of these witnesses as to dates of such disclosures, or as to the identity of the sketches they saw during 1887 with those now exhibited by Ligowsky, or as to their bias from relationship or interest, does not apply to certain disinterested mechanics, associated with Hisey in the shops of the Cincinnati Screw & Tap Company, and familiar before such disclosure with the construction of the old Peters machines. Several such witnesses fix the time when Ligowsky explained his ideas and exhibited his sketches as during the time that the Peters machines were being worked upon in the shop where both they and Hisey were employed. These witnesses, Frederick Holz, Oscar W. Muellar, George Engleheardt, W. P. Hummell, and George A.

Muenzenmair, each say that, while the Peters machines were in the shops, Ligowsky disclosed his idea of an endless belt cartridge loading machine, and explained its method of operation. Some of these witnesses identify one or more of the sketches as having been there shown them and explained. The same witnesses show that like disclosures were made to Hisey. This is made to appear in different ways. Holz says that Hisey asked if Ligowsky had explained his idea of an endless belt machine to him, and, when told that he had, expressed the opinion that his idea was not good, and his machine would be of no account. From a conversation with Hisey, he says he gathered that Hisey thoroughly understood Ligowsky's conception. Muellar says that Ligowsky explained his idea, and exhibited to him one of his sketches, and that he did the same to Hisey, because Hisey told him so, and expressed the opinion that Mr. Peters would not adopt the idea after so much labor on his own machines. George Engleheardt says Ligowsky talked to Hisey about these improvements, in his presence, "a couple of times"; says Hisey favored the old rotating table. William P. Hummell says he heard Ligowsky and Hisey talking about this endless chain improvement. Muenzenmair says he heard him talking to Hisey about his endless belt idea, and that Hisey did not seem to take much interest in the conception. Orrin E. Peters, of the Peters Cartridge Company, and familiar with cartridge loading machines, says that, while the Peters machines were being overhauled in the shops of the Cincinnati Screw & Tap Company, he was there examining the work going on; that he was accompanied by his brother G. M. Peters; that, while standing watching the machines, Frederick Holz, the president of the screw and tap company, introduced him to George Ligowsky; that Ligowsky then explained his plan for doing away with the round table carrier, and putting in an endless belt carrier, and urged its advantages. He says Hisey was standing close by him at the time, and heard the conversation, and said, after Ligowsky had walked around to the other side of the machine, that "the principle of a chain or belt was not a good one"; that it would not be rigid enough, and made other objections. G. M. Peters, the inventor of the Peters machine, says that Hisey more than once during 1887 spoke about Ligowsky's endless belt idea. Charles Biendinger testifies that in 1888, on the same day Hisey was to start for Europe, he and Ligowsky came to his place of business together; that Ligowsky said: "Hisey is going to Europe, and has come to say good-by; that he was going over to build 'those round table machines in connection with Tenner; and that I have been advising him all day to drop that round table machine, and take up my endless belt chain device, that he would be more successful with it.'" William C. Jeidinston, a disinterested mechanical draftsman, says that Ligowsky, in October, 1887, showed him sketches Nos. 1 and 6, and explained his conception; that this occurred in the shop of the screw and tap company; that he advised him to take out a patent, and replied that he would do so as soon as he had some other matters off of his hands. Ligowsky was at the time perfecting his

irrigating machine, then under construction at the shops, when the witness saw the sketch drawings referred to. The other witnesses who testify to Ligowsky's disclosure of his device to Hisey and others are August Ligowsky, Martha Ligowsky, Ernstine Ligowsky, and Fred Ligowsky, all closely related to George Ligowsky, and subject to the natural bias of relationship.

Complainants insist that this evidence of Ligowsky, supported as it is by so many witnesses corroborating him in its essential parts, is overthrown by certain evidence claimed to be in the nature of admissions by Ligowsky, inconsistent with his present position. These matters relied on as admissions of Hisey's claim to priority may be summarized as follows:

First. Alleged declarations of Ligowsky during 1888, touching Hisey's inventions and improvements in cartridge loading machines, and the fame and fortune which were sure to come to him from his inventions in that line. Concerning this line of evidence it may fairly be said that its evidential weight is much impaired from the fact that, though accessible, it was not introduced during the interference proceedings. Before a final decision had been reached in the patent office, Ligowsky died, and thus the defendant has lost all opportunity of getting Ligowsky's explanations or denial. None of the witnesses making this evidence, except certain close relations of Hisey, make Ligowsky speak specifically of the endless belt carrier as any part of Hisey's improvements. The significance of this will appear later.

Second. They rely upon certain references in a correspondence between Ligowsky and Tenner to Hisey's inventions in cartridge loading machines, and to the absence of any reference in the same correspondence to his own invention, until after he had received from Tenner photographs of an endless belt machine built at Berlin, by Hisey, for Tenner. This correspondence began early in 1888, after Tenner's return to Berlin, and continued through 1888, while Hisey was in Europe.

Third. They rely upon Ligowsky's conduct in laying aside his sketches after he says he made them in August and September, 1887, and taking no steps to perfect his invention, or protect it by patent, until after Hisey had perfected an organized and operative endless belt carrier machine, and applied for letters patent covering these very improvements. This conduct they compare with Hisey's activity in pushing his conception, constructing an organized machine, and applying for a patent as early as September, 1888.

Fourth. They rely upon two contracts made June 4, 1888, between Ligowsky and Hisey, and insist that Hisey, by these contracts, is recognized by Ligowsky as the inventor of the improvements now in dispute. These agreements are claimed to be dependent one on the other, and that the consideration for the one is the other. These contracts are as follows:

"To all whom it may concern: Witnesseth that I, Charles Hisey, of Cincinnati, county of Hamilton, state of Ohio, United States of America, do hereby agree, in consideration of services rendered, to pay or otherwise secure or place

to the credit of George Ligowsky, of the same place, ten per cent. of my shares of all values that have accrued or shall accrue from all manufactories or commercial enterprises that have realized or shall realize values on a cartridge loading machine, which is my invention. This contract to relate only to European countries. In witness whereof, I have set hereunto my hand and seal, this fourth day of June, 1888. C. S. Hisey."

"To all whom it may concern: Witnesseth that I, George Ligowsky, of Cincinnati, county of Hamilton, state of Ohio, United States of America, do hereby agree, in consideration of services rendered, to pay or otherwise secure or place to the credit of Charles Hisey, of the same place, ten per cent. of my shares of all values that have accrued or shall accrue from all manufactories or commercial enterprises that have realized or shall realize values on an irrigating machine, which is my invention. This contract to relate only to European countries. In witness whereof, I have set hereunto my hand and seal, this fourth day of June, 1888. George Ligowsky."

Fifth. They rely upon Ligowsky's attestation of Hisey's original drawing of May 10, 1888, as an admission that the latter was the original and sole inventor of the endless chain carrier idea shown therein.

The matters thus relied upon as admissions tending to establish Hisey's claim to be the first and sole inventor of the improvements in cartridge loading machinery here involved must be judged in the light of the fact that, at the time, Hisey was claiming certain other improvements in automatic cartridge loading machines, in no way involving the endless carrier idea.

In 1887, and prior to that time, G. M. Peters, of the Peters Cartridge Company, had been engaged in the perfecting of certain improvements upon the old round table type of machine, for which he obtained a patent March 29, 1887, upon an application filed March 26, 1886. That patent is numbered 360,043. The device thus patented related to improvements in machines for loading cartridge shells, and was described as consisting, "primarily, of a circular table, peculiarly actuated, and revolving within a stationary table, the revolving table being provided with the shell holding cases, the filling devices being supported by the stationary table." Two machines built under the claims of this patent were in use in the summer of 1887, at the mills of the Peters Cartridge Company. These machines did not work satisfactorily. To remedy their defects, and improve their mechanism, they were sent to the shops of the Cincinnati Screw & Tap Company, in the summer of 1887. Hisey was a mechanic employed by that company to overhaul them, and make them operative. That job gave Hisey his first acquaintance with such machines, and was also the occasion for Ligowsky's becoming interested in that line of invention. After the overhauling of the two old machines, the same company was employed to build two new Peters machines, and Hisey was again selected for this work. Certain improvements were made in the mechanism of these machines, which Hisey subsequently claimed credit for as an inventor. These improvements in no wise involved a change in the type, for the new machines constructed for the Peters Company were round table machines, constructed under the G. M. Peters patent, with certain improvements not involving the endless belt carrier idea in the remotest

degree. The improvements in these machines were claimed by Hisey, as of his own conception, and this claim was credited by Ligowsky. Subsequently, these improvements, or certain of them, became the subject of controversy between G. M. Peters, the patentee of the Peters cartridge machines, and Hisey, and became the subject of a heated interference contest between them, the issue being decided in favor of Peters, to whom a patent was issued. Precisely how wide the claims made by Hisey were does not definitely appear. Certain it is that when one Armin Tenner, a German manufacturer, visited this country, in the winter of 1887–88, he was introduced to Hisey by Ligowsky as the inventor of improved cartridge loading machinery. So much impressed was Tenner with Hisey's claims that he entered into a contract with Hisey, dated February 17, 1888, in which it was recited that Charles S. Hisey "has invented a certain novel and useful automatic shotgun cartridge loading machine, for which he is desirous of securing patents in the European countries." By this contract, Hisey authorized and empowered Tenner to apply and obtain letters patent in Great Britain, the German empire, and such other European countries as he may deem advisable; and Hisey agreed to furnish complete sketches of the machine embodying his invention, and such information as should be necessary or desirable for the use of patent solicitors, or in securing such patents; and Tenner agreed "to apply for, and, if possible, obtain, at his own expense, letters patent of Great Britain and of the German empire, and to use his best endeavors to dispose of said letters patent by sale, license, or otherwise, on advantageous terms, and to pay to Hisey one-half the entire proceeds from sale of said letters patent in European countries." At the time Hisey was making his broad claims to improvements,—claims broad enough, in his judgment, to justify describing himself as the inventor of "a certain novel and useful automatic shotgun cartridge loading machine,"—he had not, according to his own admission, conceived the endless belt carrier idea. That invention, he admits, was not made until April, 1888. That Ligowsky should refer to the improved machine claimed by Hisey, and which Tenner was to aid in pushing, as a "great success," or "a great invention," and as "Hisey's machine," or "Hisey's new machine," is quite probable and altogether natural. In the face of the strong independent evidence that Ligowsky, in 1887, claimed to have himself made the endless belt carrier invention, and that he disclosed that invention to Hisey and others during that year, it is clear that no declarations by Ligowsky, made in 1888, whether oral or written, should be regarded as conflicting with his claim to be the inventor of the endless belt idea, which do not specifically attribute that specific idea to Hisey.

We have before mentioned that the oral declarations of Ligowsky, supposed to be inconsistent with his claim to have himself invented the endless chain carrier idea, were not introduced on the interference proceedings, nor until after Ligowsky's death. But in respect of the other matters, in the nature of admissions, we are not left to conjecture as to his explanation. The contracts

of June 4, 1888, were in evidence on the interference proceeding, and Ligowsky was examined about them. The original drawing of Hisey's of May 10, 1888, was not produced on that trial, but its existence was proven as a lost instrument. Hisey's evidence made it a much more detailed drawing of an endless belt cartridge loading machine than was borne out by its actual appearance when produced on the trial below. Neither did Ligowsky deny that it was made by Hisey, nor that he had signed it as a witness. The explanation of both of these documentary pieces of evidence made by Ligowsky on the interference proceeding lies in his insistence that both himself and Hisey were then willing to combine or conjoin the several novel features of their independent improvements in cartridge loading machines for the purpose of obtaining European patents, and of pushing their inventions in Europe. This did not interfere with the right of each to obtain distinct patents in the United States, as both knew that in Europe a patent need not be applied for, as in this country, in the name of the first and sole inventor. On the interference proceedings, Ligowsky testified as follows:

"The contract with Mr. Hisey relating to cartridge loading machinery was due to a desire on Mr. Hisey's part to strengthen his European patent, and he thought, and I was of the same opinion, it was advisable to cover the principle of an endless chain cartridge loading machine in Europe, so as to strengthen the other patents which he intended to secure. Mr. Hisey expressed himself as desirous of patenting the endless chain machine abroad, and we settled on ten per cent. of his entire profits on cartridge loading machinery as a compensation for utilizing my idea abroad."

He adds, touching the claim that the one contract was the consideration for the other:

"That the contract about the irrigating machine was to compensate Mr. Hisey for any efforts, in my behalf, in the way of assistance to be rendered when this machine should be introduced over there in case I was absent."

The drawing bears date May 10, 1888, and the contract he refers to is dated June 4, 1888; but that they both had their origin in a purpose to conjoin their improvements for European purposes is a most probable solution of Ligowsky's signature to Hisey's drawing. Indeed, Ligowsky said, in the same evidence, that the contract between himself and Hisey appertaining to the profits anticipated from European patents upon their conjoined inventions was verbally agreed upon "long before Hisey went to Europe," which was not later than June 11, 1888. Touching his signature to that drawing, he said:

"Hisey showed me a drawing, not of his endless belt chain cartridge loading machine, but of my machine. He told me that he had invented an improvement on my construction, consisting, as he claims, of a driving mechanism, which was to impart motion to the machine from beneath. He explained to me at my house, and in the presence of several witnesses, the advantages that would arise from driving this machine from below, instead of from the top, as I had proposed. His method of doing this, I remember, was not definitely drawn, and he intended, as he said, to work it out more in detail. He wanted me to witness this as his improvement, and put my signature on it, and also requested my sister, who was present, to put her name to it."

He proceeds:

"We witnessed the drawing as an improvement, so claimed, on the construction of the machine that Hisey and myself had agreed to patent in Europe."

That it was a dangerous step to witness such a drawing without explaining how far it was intended to illustrate Hisey's independent invention in a way to leave nothing open to future fraud or mistake is very evident. The mistake in this particular then made by Ligowsky is most probably the potent cause of this expensive and protracted litigation. It is to be remembered, however, that at that time these two men were very intimate, and reposed in each other great confidence. That Hisey should carry to Europe with him some evidence that would entitle him to European patents was reasonable. That Ligowsky was not entirely frank about how he came to sign this drawing must be admitted. That he signed it only to show Hisey's improvement in the location of the driving machinery is not altogether credible. A close comparison of Ligowsky's sketches made in 1887 with this Hisey drawing, leaves room for doubt as to whether such a change or improvement is indicated by the drawing. It is a matter, however, about which skilled experts, examined in this case, have differed in opinion. It is to be noticed, moreover, that this Hisey drawing was not then present, and had not been seen by Ligowsky for several years. That something was said about a change in the location of the driving mechanism is likely. Several witnesses, all closely related to Ligowsky, however, do, in substance, state this. It is not an improbable conclusion that this sketch was witnessed as a drawing of an endless chain machine which Hisey and Ligowsky had agreed to patent in Europe in Hisey's name.

It must be conceded that the combined effect of the evidence we have been considering, oral and documentary, would greatly discredit Ligowsky's testimony that he made this invention in 1887. The explanations made by him of how he came to sign the Hisey drawing, and enter into the agreement of June 4, 1888, though plausible and probable in the light of the other inventions which Hisey claimed, would, in connection with his long delay in perfecting his invention or applying for a patent, in contrast with Hisey's steady persistence in pushing his claim and earlier application, incline one strongly to the opinion that Ligowsky's claim to priority of conception was not supported. But the case does not stand that way. If we set aside Ligowsky's evidence entirely, there is left in the case a mass of independent evidence tending to establish that, in 1887, Ligowsky made claim to the invention in controversy, and that during that year he exhibited the sketches he now files, as embodying a novel invention, which he disclosed and explained to others, including Hisey. A suggestion that these witnesses are corrupt is not to be tolerated. That they may be mistaken as to when these disclosures were made, or as to the identity of the sketches they saw, and as to what they heard Hisey say during that year about Ligowsky's endless belt carrier idea, is, of course, possible. But which is more probably true? The story that Ligowsky tells, as to how he came to

witness Hisey's drawing, and what the purpose of the contract of June 4, 1888, was; or that all this mass of independent evidence establishing Ligowsky's prior invention is false, or based upon error of date or identity of the invention? There is nothing intrinsically improbable in Ligowsky's explanations of acts apparently inconsistent with his claims. His explanation affords a solution of all the hard problems growing out of the contradictory evidence in the case. The best that can be said in favor of complainants' case is that the evidence in the nature of admissions by Ligowsky raises a doubt as to whether the conception in question originated with himself or with Hisey. That it is not a case of independent contemporaneous invention is clear. Either Hisey is undertaking to appropriate Ligowsky's invention, or Ligowsky has successfully availed himself of disclosures made to him by Hisey. In this state of the evidence, complainants, on this part of the case, must fail.

The evidence does not produce that clear conviction which would justify a court in saying that the patent office was in error in its decision of this question of priority. It is not enough that the declarations of Ligowsky, and his admissions, either oral or documentary, cast discredit upon him as a witness for himself. This evidence, in the nature of admissions, must be sufficiently cogent to make it clear that the independent evidence supporting the action of the patent office cannot be true. This is not the state of mind reached by us upon the questions we have been considering, and we must hold, as did the patent office and the court below, that, during 1887, Ligowsky did produce the seven sketches found in this record, and did claim the invention here involved, and did disclose to others, including the complainant Hisey, the novel features of the improvements now claimed by the latter.

Finally, it has been zealously urged that if it be admitted that Ligowsky did and said all that witnesses ascribe to him, and at the time they say they heard such disclosures, or saw his sketch drawings, the evidence of such witnesses, and the disclosure made by Ligowsky's drawings of 1887, do not establish that Ligowsky had so far developed or perfected the idea of an endless chain carrier as an element in an automatic cartridge loading machine as to entitle him to the attitude and right of the first and sole inventor of the improvements here involved.

It is said that the question here to be determined is not who first conceived the idea of an endless chain shell carrier, nor who first talked about inventing a cartridge loading machine which should utilize an endless chain as one of its constituents, or who first made ineffectual efforts to show how such a chain might become an element in an operative machine, but, rather, who first embodied in practical form the operative combination of which such an endless belt carrier was an element. This argument has been rested upon a technical criticism by experts of the Ligowsky sketches made in 1887, and a like criticism of the testimony of witnesses as to the disclosures made to them and others during that year. But if it be once assumed that Ligowsky made the

seven sketches referred to in 1887, and exhibited them to the witnesses, who have so testified, and also made the explanations of his sketches to which they testify in a general way, it must not be overlooked that the same witnesses prove that Hisey himself was one of the persons to whom the sketches were shown, and to whom Ligowsky explained his conception. Now, Hisey has in a most circumstantial way affirmed, as the very foundation of his claim to priority of invention, that he never saw Ligowsky's sketches until they were produced on the interference proceeding, and never heard from Ligowsky, or any other person, anything touching the endless chain carrier idea. But he does not stop with a mere denial that he got his idea from Ligowsky, but affirmatively and circumstantially fixes the time when the idea of an endless belt or chain carrier came to him as in April, 1888. He fixes the very place of the birth of the idea by saying that it was suggested to him while standing upon a particular street corner, and observing the operation of an endless chain upon a bicycle passing by. From an idea thus suggested, he says he went to experimenting at once, and, as a result, produced a section of endless chain and the drawing called "Hisey's Original Drawing," and in the summer of the same year made the working drawings by which was constructed, in Germany, the first operative machine embodying that idea. This whole story must be discredited if we once assume that, during 1887, Ligowsky had shown him his drawings, and explained his plan for incorporating an endless chain carrier as an element in such machines. If Hisey is thus discredited as a witness, and Ligowsky supported, we must accept Ligowsky's story wherever he comes in conflict with Hisey, and is not otherwise contradicted or discredited.

The case is not one of two independent, but identical, inventions. If Ligowsky is able to show that in 1887 he conceived the improvements here in controversy, and actually gave such substantial expression to the invention as that, without the further exercise of the inventive faculty, one familiar with the construction and operation of the old type of machine could construct a new machine embodying the novel features, it must follow, if the case be determined upon the assumption of the truth of Ligowsky's account of the matter, that he made a full disclosure of his invention to Hisey, and that the latter is not entitled to the attitude of one whose conception is later, but who first constructed an organized machine, and first applied for a patent. In other words, if Ligowsky ever invented the improvements involved, he did so in 1887, and disclosed his conception the same year to Hisey. If, in fact, Ligowsky had in 1887 such a full and adequate conception of this invention, and disclosed it to Hisey, the question as to whether he used reasonable diligence in perfecting his drawings or building a machine or applying for a patent, is a matter of no importance as the matter now stands on this bill. Hisey's case must stand or fall upon the question as to whether he is the sole and first inventor. If, in fact, he has only appro-

priated the conception of Ligowsky, it is of no moment that he made the first machine, or filed the first application for a patent. Ligowsky's neglect to push his conception to completion at an earlier date, or file an application more promptly, is of no avail to the complainants, if Hisey derived his knowledge of the improvements here involved from Ligowsky.

Upon the proceedings in the patent office, priority of application operated most favorably for Hisey. The burden was thereby thrown upon Ligowsky to show one of two things,—either that Hisey had never at any time made the invention he claimed, or that his own conception antedated that of Hisey, and thus entitled him to carry back the question of priority to the date of first conception. That burden is now, by reason of the action of the patent office, shifted; and it now devolves upon the assignee of Hisey to show that, in point of fact, Hisey's conception antedated that of Ligowsky, or that the latter never at any time made the discovery in controversy. For the purpose of this branch of the case, we shall assume that Ligowsky disclosed to Hisey, during 1887, all that he had done or conceived about the construction of a cartridge loading machine embodying an endless belt carrier. If Ligowsky's conception was at that time sufficiently developed and perfected to enable one familiar with the construction and operation of the old type of machine to construct a cartridge loading machine embodying the novel features described in the interference issue by the exercise of mechanical skill, and without further invention, he, and he alone, is the first inventor, and Hisey is merely attempting to appropriate the conception of Ligowsky. On the other hand, if Ligowsky had only an inchoate idea that in some way an endless belt carrier, suitably actuated, might be devised, which could be substituted for the old rigid circular carrier, but did nothing towards developing and demonstrating the utility of his conception, he would not be an inventor at all. The mere existence of an intellectual notion that a certain thing could be done, and, if done, might be of practical utility, does not furnish a basis for a patent, or estop others from developing practically the same idea. Agawam Co. v. Jordan, 7 Wall. 583–602; Christie v. Seybold, 6 U. S. App. 544, 5 C. C. A. 33, and 55 Fed. 69. So, if ineffectual efforts were made to give the idea form, through drawings, models, or machines, but were abandoned before reaching such a stage of completion as to require only ordinary mechanical skill to carry the conception to success, the claim of priority of invention could not be sustained against a later independent conception, carried into practical form at an earlier date. Reed v. Cutter, Fed. Cas. No. 11,645.

The solution of the contention of complainants' counsel now under consideration must depend upon the answer to the question we now reach, which is this: Did Ligowsky, in 1887, have such a complete and adequate conception of this invention as to enable a skilled mechanic, familiar with the construction and operation of the old type machine, to construct a machine embodying the

novel features of this controversy, from the description he disclosed to Hisey and others, without further invention? All that Hisey did and said during that year is competent evidence to show how far he had then developed his idea, and what he then claimed to be his invention. Whatever he said as to the nature of his invention, mode of operation, etc., is competent upon the question as to the sufficiency of his prior conception to enable him to carry back his later construction or later application to the time of his first conception.

It was said by this court in Christie v. Seybold, heretofore cited:

"That the man who first reduces an invention to practice is prima facie the first and true inventor, but that the man who first conceives, and, in a mental sense, first invents, a machine, art, or composition of matter, may date his patentable invention back to the time of its conception, if he connects the conception with its reduction to practice by reasonable diligence on his part, so that they are substantially one continuous act. The burden is on the second reducer to practice to show the prior conception, and to establish the connection between that conception and his reduction to practice by proof of due diligence."

That burden may be met by the exhibition of drawings, and by oral explanations of his conception antedating the first reduction to practice by another. Railroad Co. v. Stimpson, 14 Pet. 448; Reed v. Cutter, cited above; McCormick Harvesting Mach. Co. v. Minneapolis Harvester Works, 42 Fed. 152.

That Ligowsky did not construct a machine during 1887, or at any other time, is not vital to this question. It was said in Loom Co. v. Higgins, 105 U. S. 594, by Justice Bradley, that:

"An invention relating to machinery may be exhibited either in a drawing or in a model, so as to lay the foundation of a claim of priority, if it be sufficiently plain to enable those skilled in the art to understand it."

In McCormick Harvesting Mach. Co. v. Minneapolis Harvester Works, 42 Fed. 152, a question of priority of invention was settled upon proof of oral explanations of certain improvements touching harvesting machines made by the inventor in the presence of an old machine; the inventor orally explaining the scope of his proposed improvement, and how he proposed to apply it, in terms sufficiently clear to enable a good mechanic, familiar with such machines, to construct the device from the description given.

That Ligowsky had such an adequate conception of his invention in 1887, and made such full disclosure through his drawings and by oral explanations, sometimes by aid of his sketches, and sometimes in the very presence of the old Peters machines, as to enable persons skilled in such machines to have constructed and applied his improvements without further exercise of the inventive faculty, was one of the facts found in favor of Ligowsky in the interference proceedings by the examiner of interferences. Upon appeal, the board of examiners in chief were of a contrary opinion; but, on final appeal to the commissioner in person, the decision of the examiner of interferences was affirmed, the commissioner distinctly deciding that "Ligowsky's sketches show the endless band mechanism for giving it intermittent motion and a

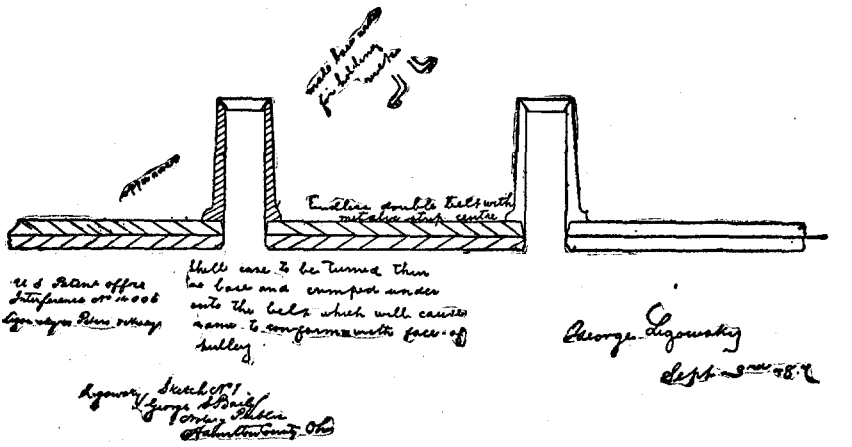
suitable shell delivery." "They, therefore," said the commissioner, "disclose the improvement in controversy sufficiently to entitle him to properly claim that he had a conception of that invention in 1887."

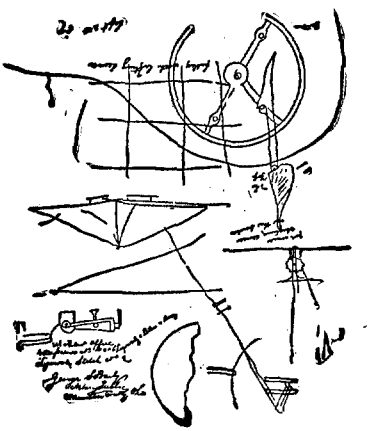
These differing conclusions of the several boards of the patent office who heard the evidence submitted upon this vital question of the adequacy of Ligowsky's conception of this invention in 1887 clearly indicate that the question was one not free from doubt, although the final conclusion was favorable to Ligowsky. Some evidence has been submitted upon this question which was not before the commissioner. It consists principally in expert opinion and criticism of Ligowsky's sketch drawings, and of the drawings and specifications attached to Ligowsky's application for a patent. These seven original sketches are undoubtedly rude and imperfect, and do not show, or attempt to show, an organized working machine. But we do not regard this as a vital defect. The claims put in interference do not involve anything more than certain improvements upon machines well known in the art, and contemplate a combination of certain novel features with the loading tools and other devices of the old Peters machine. The question as to whether these sketches so clearly show the novel features as that one familiar with the construction and operation of the Peters machine could from these construct a machine embodying the endless belt feature is one addressed to persons possessing a mass of information about the old art. If such persons, from these sketches, could construct a machine containing the improvements conceived by Ligowsky, without the further exercise of the inventive faculty, then it is very clear that Ligowsky must be held to have had a sufficient conception in 1887 to entitle him, on a question of priority, to carry the date of his invention back to the date of these drawings. That they are incomprehensible to one unacquainted with such machinery, or to a mechanic unaware of what they purported to be, is no answer. That they do not in all respects show the relation of the novel features to the old loading tools, nor describe precisely the mode of attachment, nor, with scientific exactness, show other details of the combination, is not fatal, if the absent features are such as would be readily supplied by a mechanic familiar with the subject, and without requiring further invention. The well-known statement of the doctrine touching the sufficiency of description in the specifications and drawings of an application for a patentable novelty by Justice Bradley, in Loom Co. v. Higgins, 105 U. S. 586, applies with even greater force to the adequacy of such sketch drawings, when the question is one of carrying back the date of an invention to the time of first conception. In the case referred to, Justice Bradley, for the court, said:

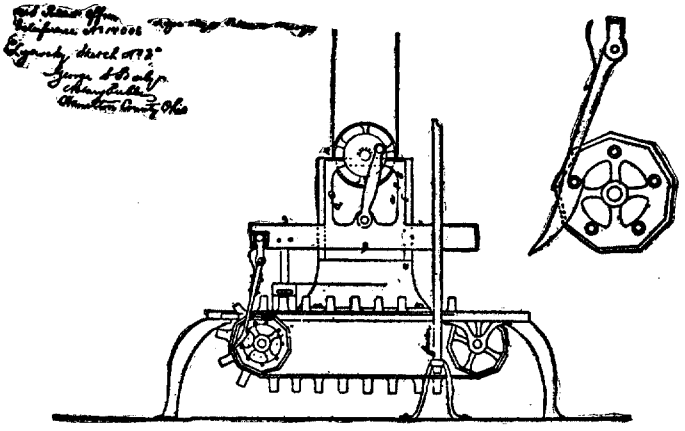
"If a mechanical engineer invents an improvement on any of the appendages of a steam engine, such as the valve gear, the condenser, the steam chest, the walking beam, the parallel motion, or what not, he is not obliged, in order to make himself understood, to describe the engine, nor the particular appendage

to which the improvement refers, nor its mode of connection with the principal machine. These are already familiar to others skilled in that kind of machinery. He may begin at the point where his invention begins, and describe what he has made that is new, and what it replaces of the old. That which is common and well known is as if it were written out in the patent, and delineated in the drawings."

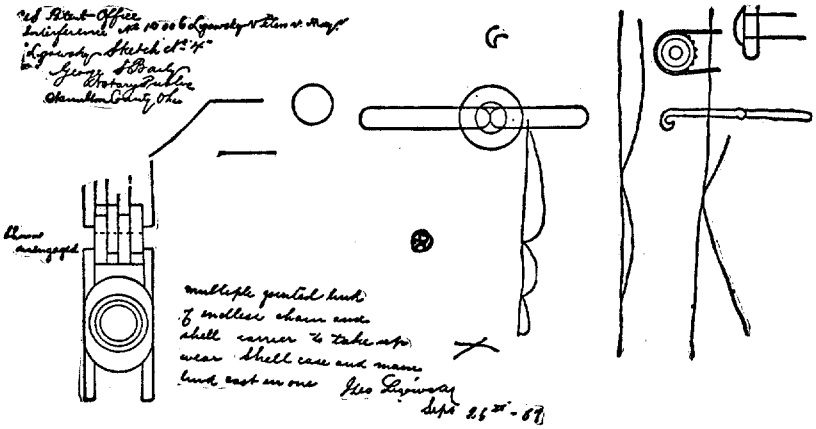
The seven drawings made by Ligowsky are not a connected series. Neither do they, or any one of them, delineate a fully organized machine. Some of them represent one feature, and some another, and all show that they were experimental in character, and indicate but roughly the progress of the idea in the inventor's mind. We here set them out, prefacing that the one appearing to be No. 6 is the first made in order of time.



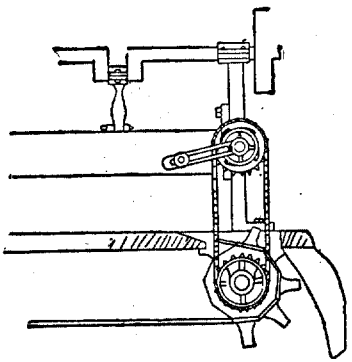




George Ligowsky



George Ligowsky



George Ligowsky

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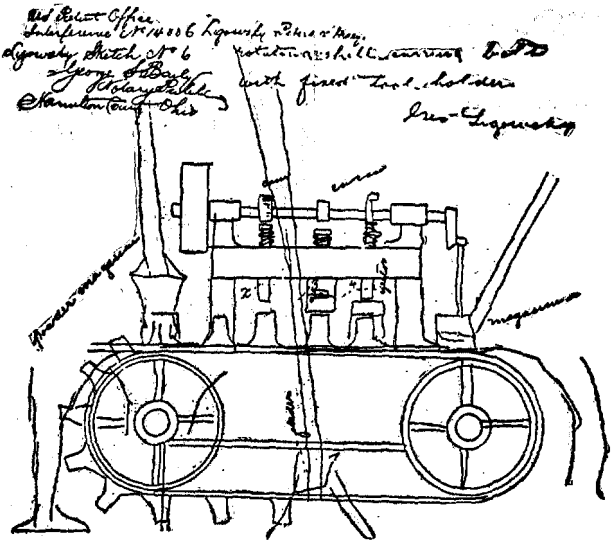

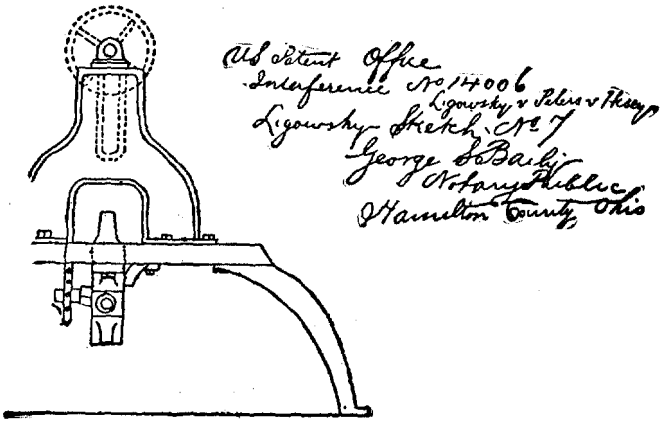

The explanations and notes found on them were generally contemporaneous with the sketch, and are to be taken as constituting evidence as to the state of the conception in the inventor's mind at the time. The explanation made by Ligowsky of these drawings on the interference proceeding was as follows:

"Q. 25. Please look at sketch No. 1, and state what it is intended to represent. A. Sketch No. 1 shows a double endless leather belt, with a centrally inserted thin metal steel band, riveted together with copper rivets. Upon the outer face of this belt are mounted metallic shell cases of carriers, whose bore coincide with a hole cut in said endless belt, so as to allow the empty shells to be inserted. On said drawing I observe notes written in my handwriting, explaining the details and manner of making such a belt. The first note reads: 'Shell case to be turned thin at base, and crimped under into the belt, and which will cause same

to conform with face of pulleys.' Second quotation: 'Endless double belt with metallic strip center.' Last note reads: 'Make base wider for holding rivet.' This referred to a method of stiffening the shell case on the belt. Q. 26. State when these notes quoted in your last answer were put on the drawing. A. My recollection is that these notes were added to the drawing a day or two after it was made. There was some difficulty in securing this case firmly on the leather, and various ideas occurred to me; but the crimping under of the thin end of the case prevailed with me, and, in order not to have it slip my memory, I made a note of same upon the drawing. Q. 27. Please look at sketch No. 2, and describe what it is intended to represent. A. Sketch No. 2 shows a pulley for driving an endless belt in combination with an actuating device. This actuating device consists of a can-nosed link and hook, which was to be driven from above by an eccentric or cam wheel, which would impart a reciprocating motion to the same to the link. The operation of this link, which was pendent from a knee joint, shown just below the word 'top,' and above the red line of the sketch, is as follows: The link, in its downward stroke, comes in contact with a pin and roller mounted in the spokes of the pulley, engaging itself with the pin and roller by sliding along on same until the portion of the link representing the barb or hook of the link is reached, whereupon, being pendent, it drops into engagement by its own weight. There is a note on here, which I will read: 'Pulley with lifting device for an endless belt.' The note is on the right hand of the drawing, at the bottom, just below my signature and the date. Q. 28. In whose handwriting is the note, and when was the same put on the drawing? A. The handwriting is my own, and it was executed together with the date, on September 3, 1887. Q. 29. Please look at sketch No. 3, and describe the construction and intended operation of the machine there illustrated. A. Sketch No. 3 represents a sketch made by me of a shell loading device, consisting of two polygonal wheels or pulleys carrying an endless chain, with shell cases or carriers on the individual links, and said chain mounted in position on a frame. The combination of the frame and reciprocating tool carrier is shown, and the method of attaching the actuating link to the driving polygonal pulley. The tool carrier is shown in position in a guiding frame, and in connection with an eccentric disk by means of a short pitman. In rear of this eccentric disk is shown a driving pulley and belt. The guide for the tool carrier is under cut, and hangs over the center of the table which holds the chain. To the right, and marked by the word 'feeder,' is shown the feeding tube in position, and mounted on the supporting spider or rest. On the right-hand upper corner is shown a detail view of the actuating pulley and driving link. Q. 30. Please look at sketch No. 4, and state what it is intended to represent. A. Sketch No. 4 is a sketch made by me on September 26, 1887, which is best explained by an accompanying note written in my handwriting, and which reads as follows: 'Multiple jointed links of endless chain and shell carrier to take up wear. Shell case and main link cast in one.' This link was intended to be made with an intermediate short link, and double pinned, so as to reduce its wear. Q. 31. Please look at sketch No. 5, and state what the same is intended to represent. A. Sketch No. 5, bearing my signature, and dated November 7, 1887, represents a sketch of one end of the driving end of my cartridge loading device, showing an improved method of driving same by means of a combined sprocket and chain, and pawl and ratchet movement. Said pawl and ratchet movement being driven from the tool carrier by the means of a slide link and roller, the pawl being inserted at one end of the link, near the axis of the sprocket wheel, and engaging into the teeth of the ratchet wheel, which is set before the sprocket wheel. This engagement is accomplished either by a light inward pressure, produced by a spring, or by a gravity pawl. Q. 32. Please look at sketch No. 6, and state what it represents. A. Sketch No. 6 represents a cartridge loading device, bearing my name and note written in my handwriting. The note reads: 'Rotating shell carrying belt, with fixed tool holder.' I believe this sketch to be my first idea of an endless belt cartridge loading device; said sketch bearing evidence of having been executed at the Screw & Tap Co.'s shop, being drawn on the heavy peculiar drawing paper used at this place. In this sketch the tool carrier is stationary, and the loading tools are intended to be driven through a fixed rest, by cam or crank motion, from a shaft running parallel with the tool carrier. The shell feeding tube or device, marked with the word 'feeder,' is shown in its proper position

on this sketch. Also, the powder magazine, shot magazine, wad-cutting device, and the ejector, shown in their relative positions. Q. 33. Please look at sketch No. 7, and state what it represents. A. Sketch No. 7 represents a scrap which I recently found in the drawer of my drafting table. Evidently, by accident, a portion of this sketch was torn off. Whether this sketch originally had any date or signature, I cannot positively state; but it was made, I am positive, about the same time the other completer sketches were made. The visible portion of this sketch shows the end view of an endless chain cartridge loading device, with a differently arranged tool rest guide. This guide is in the form of an arch, with a port or aperture underneath, through which the chain would run. Underneath is shown an end view of the polygonal driving wheel carrier lying around it. To the left of the polygonal wheel driving shaft is shown the sprocket wheel, driving the polygonal wheel and chain. On top of the tool carrier guide is shown the location of the bearings for the crank shaft, for driving the tool carrier. In dotted lines is shown the path of travel of the ends of the tool carrier and of the driving pulley."

To show the wide difference of opinion as to what is shown by these drawings, we set out the view Hisey took of them upon the same trial:

"A. After examining the sketches Nos. 1 and 7, inclusive, I am unable to see a machine in an organized form. Sketch No. 3, in so far as I can see, shows an endless band, a cross-head and connections to a crank wheel, and a bracket or housing over and above the main table, and a device for moving said chain, which, from my experience as a mechanic, would not give the band or chain an accurate motion, as there is no device shown to stop the chain or band at its proper place. The momentum which the device, as shown in sketch No. 3, gives the band, would carry it past its proper place; and this sketch showing no device or tool for placing the powder, no wad devices, no shot device, and no wad rammers, but shows some kind of a device near the driving prismatic disk, and on top of the main table, that I do not understand. Sketch No. 6, I am unable to say what it represents. Sketch No. 1 shows in part and in straight line possibly meant for a band, but, as it is shown solid throughout the view, I cannot see how it could be used in an endless band cartridge loading machine. Sketch No. 5 shows a portion of a crank shaft, and a connection to a piece that I am unable to say what it represents; this crank shaft or piece having a bracket support and bearing as shown in sketch, and a device with an endless sprocket chain, but cannot see what it is intended to perform. It also shows a portion of a leg, and a portion of a table, and a portion of a band. Sketch No. 2 shows a wheel or pulley with some kind of a hook device similar to that in sketch No. 3. Sketch No. 4 shows a sprocket wheel and a piece of chain wrapped around it. The rest of the sketches on sketch No. 4, I am unable to make out what they are. And sketch No. 7 shows, I should judge, in part, an end view, in part; but I am unable to make out what it represents."

Two technical experts, Mr. Melville E. Dayton and Mr. James W. See, were examined for the complainants. Their testimony was of great length, and their cross-examination equally as elaborate. It must be said as to both of these witnesses that, while they show great critical capacity, neither has any practical experience in the construction or operation of cartridge loading machines. Their evidence is, in substance, an elaborate argument for the purpose of showing that the sketches of Ligowsky left unsolved many mechanical questions, which were of such dignity, in their opinion, as to require invention to carry into practical effect the endless belt idea indicated by these drawings. Upon the other hand, the soundness of the judgment of the patent office as to the adequacy of these sketches has been supported by the opinion of certain other mechanical experts, who have the clear

advantage of being thoroughly acquainted in a practical way with the construction and operation of cartridge loading machines. These witnesses are Franklin L. Chamberlain and Fred Holz. Mr. Chamberlain had been in the business of designing, constructing, and operating cartridge loading machines for about 20 years, and was the patentee of two machines of the old type, being patents Nos. 295,980, issued April 1, 1884, and 320,219, issued June 16, 1885. This disinterested and very intelligent witness was of opinion that these drawings, taken together, do show, to one familiar with the subject, the endless chain and mechanism for moving the same. He also said that:

"They show, further than this, a rough view or sketch, which is a very proper term for the papers, of the ideas of an inventor, as plainly shown, and in many instances written in words that show, in addition to the idea given by their form, what parts of the machine are represented; and that, taken together, we have the essential features of a complete machine, showing powder magazine, rammer, powder feeder, wad strip, ejector, shell feeder, cones, and cranks, but not duplicating rammers or wad feeders, such duplication not being necessary in an inventor's sketch."

Comparing the claims made by Tenner in his application for British patent No. 12,140, on substantially the same claims now in issue, this witness was of opinion that these sketches show all the essential features found in that patent, and that they adequately represent and illustrate all the essential features covered by Ligowsky's application for a patent filed June 20, 1889. The practical knowledge of this witness entitles him to a great deal of weight, and the very clear way in which, under a very trying and prolix cross-examination, he vindicated his technical knowledge of the matters here involved, serves to give his testimony additional weight.

Mr. Frederick Holz was likewise a practical machinist, and acquainted with the old form machine, both in construction and mode of operation. He was the superintendent of the Cincinnati Screw & Tap Company, and Hisey's work in remodeling the old Peters machines was done under his supervision. Mr. Holz was of opinion that any skilled mechanic, technically acquainted with the old form of machine, could, aided by these Ligowsky sketches, construct a machine embodying the endless belt idea, and adapt the same to the old loading tools and other devices of the old art. He thought that he himself would have no difficulty to overcome in building such a machine which could not be removed by the exercise of purely mechanical skill and technical knowledge.

William S. Bates, a mechanical expert of considerable experience, has also testified favorably to the adequacy of these sketches as a guide in the construction of a machine when supplemented by a technical acquaintance with the Peters machines and mere mechanical skill. This witness was also of opinion that the photographs of the machine made by Hisey and Tenner in Germany, and which were confessedly used by Ligowsky and the draftsman who aided in the preparation of his drawings and specifications for his application for a patent, show substantially the devices

indicated by Ligowsky's sketches in combination with the loading tools and other devices found in the old Peters machine; the loading tools of the Peters machine being arranged in a cluster, while in both Ligowsky's sketches and the photographs of Hisey's machine they are in a straight line.

It is deemed unnecessary to enter upon a critical consideration of the alleged defects in these sketches, whatever they are, although some of them seem quite serious. The experts examined in favor of complainants' view of the case have strongly presented the reasons in support of an opinion that these sketches are so imperfect and vague as to require one undertaking to construct such a machine by their guidance to further exercise the inventive faculty. On the other hand, the opposing experts are equally clear in opinion that the sketches are sufficiently clear and complete to enable one familiar with the old art to construct such a machine, and properly arrange the loading tools and other devices of the Peters machine, in combination with the novel features illustrated by the sketches, and covered by the claims of Ligowsky put in interference.

It has been asked why Ligowsky laid aside his sketches, and ceased to work out his conception; and the suggestion is made that he found himself confronted with mechanical problems which he could not solve, and had therefore abandoned his conception as not practical. This suggestion has its weight, but is seemingly met by his own account of the matter, which, in substance, is this: First. That he endeavored to interest the Peters Company in his invention without result, his information from Holz being that they were not likely to throw away all their labor on their own invention to try another experiment. Second. He was a poor man, without capital to construct a machine or push his invention. Third. He was, on his evidence, steadily endeavoring to get Hisey to take up the conception, and combine it with what he then supposed to be Hisey's new round table machine. That Hisey knew all that Ligowsky had developed is true on Ligowsky's evidence, and is in accord with what we should expect from a knowledge of human conduct. They were both speculative inventors, exceedingly intimate, as a consequence of their interest in cartridge loading machinery. That they should fully discuss all the advantages and disadvantages of this new idea is just what we should expect, and just what occurred, according to Ligowsky. The latter says that he explained his conception to Hisey, with the old machine present, and illustrated his conception with chalk sketches made at the shop. To a quick, smart mechanic like Hisey, such an oral explanation, aided by the exhibited sketches, or by chalk sketches, was quite sufficient to put him in full possession of the whole idea. There is a sense in which Hisey's original drawing No. 1, of May 10, 1888, is properly to be regarded as an expression by Ligowsky of his conception. If that was drawn as an expression of Ligowsky's plan, only changing the location of the driving power, then it is but another document illustrating the progress of the inventor, and the clearness and fullness with which he had disclosed

his conception to one who, in a sense, was but a draftsman, acting for him.

The line between that which is invention and that which is but the exercise of mere mechanical skill is sometimes difficult to trace. But we have come from the reading of the arguments of counsel, and the disquisitions of the experts, with a more or less decided impression that that which remained imperfect in the Ligowsky sketches was remediable by the exercise of the technical knowledge of mechanics familiar with the construction and operation of the old Peters machine. It certainly is not clear that the defects which are observable in those sketches are greater than would be found in any rough experimental drawings of complicated machinery,—drawings not intended to do more than suggest what was then in the mind of the inventor. This impression requires that that which has been done shall stand. The complainant has not produced that "thorough conviction" that he is the first inventor of these improvements, which he must do to justify a decree annulling the deliberate and well-considered action of the patent office. The assumption that Ligowsky did and said all that is ascribed to him leads to the conviction that all the knowledge which Hisey had when he produced his original drawing of May 10, 1888, or his working drawings in the summer of that year, was derived from Ligowsky, and that the disclosures to him were sufficiently full and clear to enable him, as a good mechanic, to complete that which was defective, and construct a machine upon the description which had been given him. There are many inexplicable things tending to cast a doubt as to who is the first inventor. Some of them we have stated, and others have not been specifically referred to. On the whole case, however, we lean to the correctness of the judgment of the circuit court, and of the action of the patent office. This mental attitude is one which requires that the decree of the circuit court shall stand. It is therefore affirmed, with costs.

THE CITY OF KINGSTON.

BUTLER v. THE CITY OF KINGSTON.

(District Court, D. Washington, N. D. November 24, 1896.)

SHIPPING—INJURY TO PASSENGER—BURDEN OF PROOF.

The law imposes upon carriers of passengers the duty of exercising a high degree of care for their safety, and, in particular, of seeing that all openings in the decks of vessels, upon which passengers are permitted to walk, are securely closed or guarded; and, where a passenger is injured by the giving way of the cover of an opening in the deck, it is incumbent upon the owner of the vessel to show, affirmatively, that there was no fault or negligence on the part of the officers and crew, causing the injury.

In Admiralty. Libel by Lawrence P. Butler, claiming damages for a personal injury, suffered while a passenger on the steamer City of Kingston. Decree for libelant, awarding $1,200, with interest and costs.