defendant, being a citizen of the same State with the plaintiff, there was no right of removal on the part of Montague, or of the intervening defendant, the Oswego township, on the ground that the Union Savings Association was a formal, unnecessary, or nominal party."

Further comment is not required. The decree of the Circuit Court must be

Reversed, and the case remanded, with instructions to sustain the plea, and to dismiss the bill for want of jurisdiction.

DEERING *v.* WINONA HARVESTER WORKS.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF MINNESOTA.

No. 54. Argued November 5, 6, 1894. — Decided December 3, 1894.

The first claim in letters patent No. 223,812, issued January 27, 1880, to William F. Olin for an improvement in harvesters, describing a swinging elevator, located upon the grain, (or ascending,) side of the main belt, pivoted at its lower end and movable at its upper end, is not infringed by a similar device, located upon the stubble side, pivoted at its upper end, and swinging at its lower end.

When an inventor, who may be entitled to a broader claim than he makes, describes and claims only a part of his invention, he is presumed to have abandoned the residue to the public.

Oral testimony, unsupported by patents or exhibits, tending to show prior use of a patented device is open to grave suspicion.

Unsuccessful and abandoned experiments do not affect the validity of a subsequent patent.

The 20th claim in letters patent No. 272,598, issued February 20, 1883, to John F. Steward for an improvement in grain binders is valid, and was infringed by the appellees.

The 21st claim in those letters patent was not infringed by the appellees.

This was a bill in equity for the infringement of letters patent No. 223,812, issued January 27, 1880, to William F. Olin, for an improvement in harvesters, and patent No. 272,598, issued February 20, 1883, to John F. Steward, for an improvement in grain binders. The original bill was founded upon five different patents, but appellant acquiesced in the

decree of the Circuit Court dismissing his bill as to all but the two patents above named.

In the patent to Olin for an improvement in harvesting machines, the patentee stated in his specification as follows:

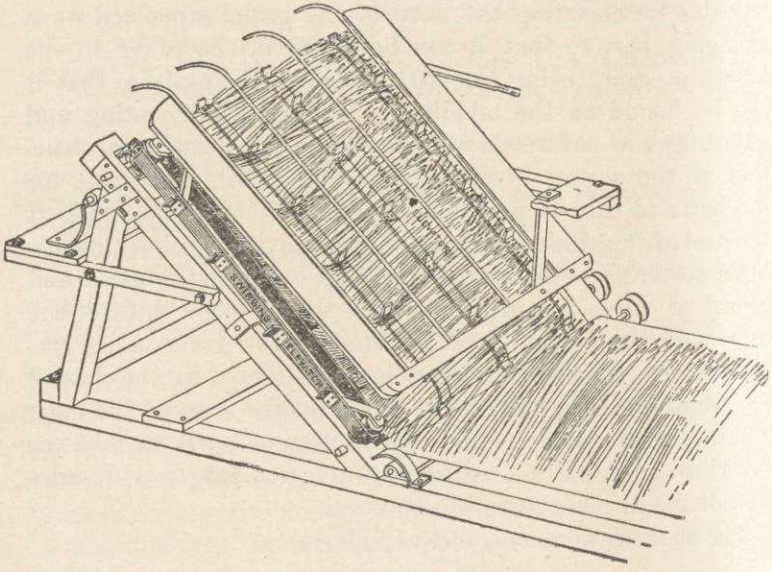
"In that class of harvesting machines where the grain is received upon a carrier-platform and elevated over the drive-wheel by an elevator and deliverer to the binders or an automatic binder, it is desirable that there shall be no stoppage in the flow of the grain in its passage to its place of delivery; that the butts of the grain shall be carried up parallel, or nearly so, with the heads of the grain, so as to deliver the grain in proper shape for binding purposes, and that the grain shall be delivered to the receiving-table so that it can be bound at or near the middle.

"The object of this invention is to provide devices for attaining all of these results; and it consists in interposing a roller between the lower end of the elevator and the inner end of the grain-carrier, to facilitate elevating the grain and prevent clogging at that point, and prevent the grain from being carried down or falling through between the elevator and carrier; in providing a belt or chain at the grain side of the machine for elevating the butts of the grain, supported on a swinging bar, so that it can be adjusted, according to the length of grain being elevated, to deliver the grain so that it can be bound at the middle; in devices for operating and adjusting the elevator for the butts; in the peculiar construction of the cover; in arranging and operating the belt for the butts so that it prevents any clogging by short grain at the heel of the sickle; in arranging the device for elevating the butts so that it will bear against the butts of the grain and crowd or move the grain back on the elevator toward the centre, for the purpose of straightening the grain in its passage up the elevator, and delivering it so that it can be clasped or bound near the middle, to facilitate the ease of binding; and in the several parts and combination of parts hereinafter described as new." Here follows at great length a description of the device claimed to be novel.

The specification concludes as follows:

"The butts of grain are heavier than the heads, and consequently lag behind unless some means are provided to make them move faster than the heads. In order to elevate the butts even with the heads the belt or elevator Q is so arranged that the teeth *b* will engage with the butts of the grain on the roller I and carry them up while the heads are being carried up by the elevator-belts M. The lower pulley, *c*, is to be so arranged that it will permit the teeth *b* on the elevator Q to clear the end of the roller and engage the butts, and this pulley *c* is located as close to the main frame as is possible and permit the operation of the butt-elevator, which location of the pulley brings the butt-elevator in position to enable it to catch any short grain, which short grain is liable to fall down and be caught by the heel of the sickle and clog the sickle. By locating the lower pulley, *c*, of the belt Q at the proper distance above the main frame A the teeth *b* on the elevator will come in contact with such short grain and force it forward on to the carrier-platform, thus keeping the heel of the sickle clear at this point."

The following drawing exhibits the "swinging elevator" feature of the patent:



Statement of the Case.

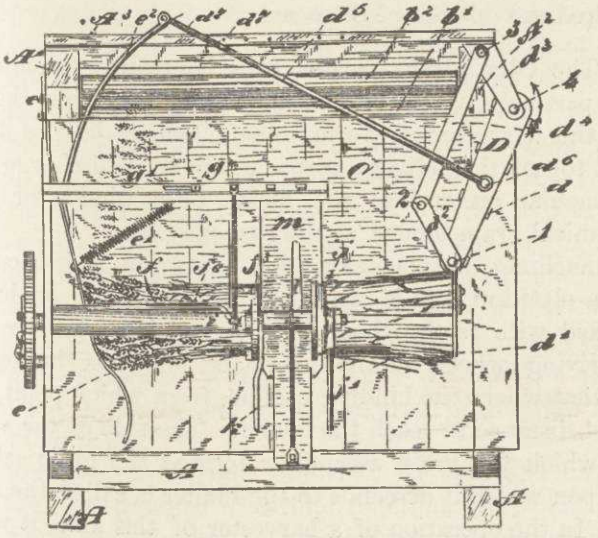
The plaintiff claimed an infringement of the first claim of the patent, which reads as follows:

"1. In combination with a harvester elevator a swinging elevator pivoted at its lower end and suitable devices for shifting its upper end, whereby the swinging elevator forms a means for elevating the butts of the grain and delivering grain of different lengths at the same point, substantially as specified."

In the patent to Steward for improvements in grain binders the patentee stated —

"The object of my invention is to provide means, that, combined with an automatic grain binder, shall make it automatically regulate the position of the band on the gavel — that is, shall automatically place the band upon the gavel in its proper position relative to the length of the grain without any aid or attention from the operator — and its nature consists in locating, in such a position as to be influenced by the heads of the incoming grain, or gavel or bundle, a device to be moved thereby, the said device connected with means for adjusting the relative positions of the said grain and the binding mechanism."

The following drawing exhibits the patented device:



The plaintiff claimed an infringement of the twentieth and twenty-first claims of the Steward patent, which read as follows:

"20. The combination, in a grain-binder, of moving butt-adjusting mechanism and the board d^1, substantially as described.

"21. The combination of the swinging butt-adjuster, the arms d^2, d^3, d^4, and the board d^1, pivoted to the swinging butt-adjuster, substantially as described."

Upon a hearing upon pleadings and proofs, the court below dismissed the bill upon the ground that the Olin patent was not infringed, and that the Steward patent was invalid by reason of a certain device theretofore used, which was held to have anticipated the patent. From this decree plaintiff appealed to this court. The opinion of the Circuit Court is reported in 40 Fed. Rep. 236.

Mr. Thomas A. Banning for appellant.

Mr. Philip C. Dyrenforth for appellees.

Mr. Justice Brown, after making the foregoing statement, delivered the opinion of the court.

1. The Olin patent relates to a harvesting machine, and more particularly to a certain method of elevating the grain from the harvester platform, upon which it falls as it is cut, to the top of the delivery apron, where it is discharged from the machine either into the hands of a binder, or into a mechanical grain binder, as the case may be.

In machines of this description the grain, as it is cut, falls upon a platform, and is carried to the base of an endless belt provided with teeth, which seize the grain and carry it over the driving wheel of the harvester, up to a higher level than that where the binding is done, from which point it falls a short distance to reach the binder. The side of the elevator upon which the grain ascends is termed the grain side; the side upon which it descends to the binder is called the stubble side. In the operation of a harvester of this kind it was ob-

served that, as the grain mounted the elevator on the grain side, the butt end of the stalks, being heavier than the heads, exhibited a tendency to lag behind, so that the stalks assumed a diagonal position across the harvester platform. The consequence of this was that the heads of the stalks were delivered to the binder in advance of the butts, and obliquely — a peculiarity which interfered with the proper binding of the grain. In addition to this, the different lengths of the stalks required some means whereby the binding band might be placed centrally to their lengths, that is, if the stalks, after being cut, are twelve inches long, the band should be placed about six inches from each end, but if the stalks are five feet long, it should be placed about two and a half feet from each end. To obviate the difficulty of the butts lagging behind, and also to secure proper delivery of the grain as to length, Olin invented an auxiliary belt located at a right angle to the main belt, but moving in the same direction and at somewhat greater speed. This auxiliary belt was also provided with teeth, which engaged the butt end of the stalks, and, moving faster than the main belt, kept the butts up to a level with the heads. As shown and described in the patent, this auxiliary belt was arranged with one end located at the lower end of the main belt and near the carrier platform, and the other end at the apex of the main belt or the highest point at which the grain ascends. The mechanism was intended to act upon the swath of flowing grain, and change its direction, pushing the stalks endwise, so that they might be delivered to the binder in proper position to be bound in their centre, and also hastening their butts so that the stalks might not be delivered diagonally, but parallel with each other and with the flow of the main belt. The claim describes this swinging elevator as pivoted at its lower end, with suitable devices for shifting its upper end, whereby it forms a means for elevating the butts of the grain, and delivering grain of different lengths at the same point.

Devices bearing certain similarity to this, and having in view the performance of a like function, were not wholly unknown to the prior art. These devices, though not claimed

to fully anticipate the Olin patent, are important in their bearing upon the construction of this patent and upon the alleged infringement by the defendants.

Thus the patent to Elward of July 6, 1875, exhibits two rollers mounted in front of the horizontal belt. These rollers carry a short belt or apron, whose face, like that of the Olin patent, is perpendicular to the face of the horizontal belt. It is stated in the patent that one of these rollers may be driven by proper gearing, and it is so represented in the model. The face of this small belt moves in the same direction as the horizontal belt, and is set at an angle with the line of direction or travel of the grain. The specifications state that this belt or apron "may be operated either by the friction of the passing butts of the grain, or it may be given a positive movement by gears or belts and pulleys from any convenient driving shaft, the movement of the apron in either case serving to move or shove backwards the butts of the grain projecting over the finger-bar." This auxiliary belt of Elward's acts much in the same way in relation to grain moved by and on the horizontal apron that the auxiliary belt of Olin does upon grain carried upward by the main horizontal belt, shoving the grain endwise toward the rear of the machine while it is being carried along. No method is stated, however, by which the canvas may be rotated, and even if it were, it would still be incompetent to perform the office of the Olin belt, because it is not adjustable at either end.

The patent to George F. Green of March 6, 1877, also shows an adjustable butter, which he designates as a grain guide, pivoted at the lower front corner of the elevator frame, on the grain side, and provided at its upper end with a handle convenient to the driver sitting in his seat. This so-called grain guide is much like that of Olin's in shape and location, though apparently not provided with a movable belt, and hence not adapted to hasten the ascent of the butts, but only to shove back the butts of the shorter stalks. Instead of operating to hasten the butts, it can only operate to retard them to the extent of the friction between the butts and the surface of the board.

The patent to C. W. and W. W. Marsh of January 5, 1864, shows alongside of the main belt, an auxiliary belt, mounted on the same rollers as the main belt, and therefore proceeding at the same speed. The horizontal belt carrying the grain over the harvester platform is described as travelling faster than the main elevator, so as to operate to straighten the grain, or bring the stalks parallel to each other before beginning their ascent. The auxiliary belt, however, is not arranged on vertical rollers as in the Olin patent, but upon the same rollers as those carrying the main belt; neither is it pivoted at its lower end, nor capable of being shifted at its upper end, and hence is incapable of moving the grain endwise to even the butts. There are two or three other patents, which appear to have a somewhat remoter bearing upon the Olin patent, but are not necessary to be noticed in the consideration of this case.

The gist of Olin's invention seems to be in his taking the grain guide used by Green, providing it with a belt and teeth somewhat upon the principle of the independent belt or bands used by the Marshes, travelling faster than the main belt, and for the purpose of keeping the butts in line with the heads of the stalks. The important feature, however, connected with all these prior patents is found in the fact that the devices described in them were all located on the grain side of the elevator, and were designed to secure parallelism in the stalks, as they mounted the main belt, and before they reached its apex. Olin proceeded upon the same theory, and located his swinging elevator or auxiliary belt upon the same side of the main elevator, and described it in his claim as pivoted at its *lower* end, with suitable devices for shifting its *upper* end.

In defendants' device, the grain is carried up upon the main belt or elevator, as in the Olin patent, without, however, any means whatever for hastening the butts or moving the stalks endwise upon the harvester elevator; but, after having been lifted or carried over the apex of the main belt, and while descending upon the stubble side to the binder, they are adjusted in position by a travelling belt or apron almost identical in principle with that of the Olin patent, but pivoted at its *upper* end and swinging at its *lower* end. This device is

shown in a patent to Bullock & Appleby of October 31, 1882, in which the prior use of the plain face deflector board or surface was recognized, but was said not to be a sufficient means for effecting the desired adjustment of the grain stalks endwise. "The butt ends of the stream of grain will lag by contact with the stationary surface of such a designed deflector or adjuster, and the grain will not be properly guided to the binder or the point at which the binding is to be done." Their invention consists, as they state, essentially in the employment of an adjuster and deflector composed of a travelling surface, mounted in an adjustable frame, and provided with suitable means for operating it, by which the cut grain, while passing from the delivery end of the conveyer to the binder, shall be perfectly adjusted lengthwise of its stalks and to an extent corresponding to the length of the grain, so as to effect a presentation of the grain always in a given relative position to the binder devices of the machine and in proper condition for binding.

The third and most important claim of that patent was for "an endless belt moving in the direction of the grain delivery and operating in contact with the stubble end of the grain on its passage from the elevator to deliver it to a binding mechanism, substantially as set forth."

The real question in this case as between these two devices is, whether the first claim of the Olin patent describing a swinging elevator located upon the *grain* or ascending side of the main belt, pivoted at its *lower* end and movable at its *upper* end, can be construed to cover a similar device located upon the *stubble* side, pivoted at its *upper* end and swinging at its *lower* end. We are of opinion that it cannot. Plaintiff claims in this connection that, by the *lower* end of the swinging elevator is in reality meant the *receiving* end, and that, as the defendants' device (which can hardly be called an elevator at all, since it facilitates the *descent* of the grain) is pivoted at its receiving end, which happens to be its upper end, it is within the spirit though not within the letter of the claim. But of whatever elasticity of construction this claim might have been susceptible, if it had been a pioneer patent, it is

clear that, in view of the prior devices, of which it was only an improvement, and of the explicit language of the specification and claims, the patentee had only in view an auxiliary belt located upon the grain or ascending side of the elevator. Indeed, from the statement in the introduction of the specification through all the description and in each of the claims, care is taken to emphasize the fact that the invention relates to the combination, with the ordinary harvester elevator, of a butt elevator which operates upon the butts of the grain while the grain is being lifted upon the main belt, so as to hasten the ascent of the butts, and move the stalks back upon the harvester elevator. In no one of the six claims of the patent is there a suggestion that the elevator or belt Q could be located upon the stubble side, although this belt is made an element in all but one of the claims.

If Olin had been the first to devise a contrivance of this description for adjusting the flow of grain upon the main elevator, it is possible that, under the cases of *Ives* v. *Hamilton*, 92 U. S. 426, and *Hoyt* v. *Horne*, 145 U. S. 302, a construction broad enough to include defendants' device might have been sustained. But in view, not only of the prior devices, but of the fact that his invention was of doubtful utility and never went into practical use, the construction claimed would operate rather to the discouragement than the promotion of inventive talent. Not only does it appear that the device described in this patent did not go into general use, but that the mechanism set forth in the patent to Bullock & Appleby of October 31, 1882, under which the defendants manufactured their machines, was extensively sold throughout the country for about eight years before any assertion of adverse right under the Olin patent, and that the plaintiff himself became a licensee under the Appleby patent, and manufactured his own machines in accordance therewith.

Another fact is deserving of consideration. While the application for the Olin patent was pending, another application was made by McGregor & Flennekin, showing a grain adjusting device similar to that used by the defendants; that is, a butt-adjuster like that of Olin's, but located upon the descend-

ing line of grain travel, and pivoted at its upper end instead of its lower end. This application was thrown into interference with that of Olin — the examiner holding the subject-matter involved in the interference to be "an endless belt moving in the direction of the grain delivery, operating in contact with the end of the grain to deliver it to a binding mechanism." This interference seems to have been decided in Olin's favor, since a patent was subsequently issued to him; but inasmuch as he thus was warned of the claim of McGregor & Flennekin, and of its extent, it is somewhat singular that he did not at least endeavor to obtain an enlargement of his claim, to cover an endless belt moving in the direction of the delivery, whether such belt were located upon the grain or stubble side of the elevator, and thus anticipate McGregor & Flennekin. His failure to make an effort in that direction indicates a consciousness on his part that he had limited himself to an endless belt upon the grain side, and the fact that the McGregor & Flennekin patent was subsequently issued, with the broad claim of the endless belt moving in the direction of the grain delivery, indicates that, notwithstanding the interference, it was not considered as anticipated by the Olin patent previously granted. In the meantime, and during the pendency of the Olin application, Bullock & Appleby applied for a patent upon the combination of the travelling apron with the table of the grain binder, as used by these defendants, and a patent was issued to them October 31, 1882. If Olin were entitled to all that plaintiff now claims, it would seem that the patent to McGregor & Flennekin, as well as that to Bullock & Appleby, are infringements upon his own. It is possible that Olin was entitled to a broader claim than that to which he limited himself; but if he described and claimed only a part of his invention, he is presumed to have abandoned the residue to the public. *McClain* v. *Ortmayer*, 141 U. S. 419. There was no error in holding that the Olin patent had not been infringed.

2. There are twenty-one claims in the Steward patent, the last two of which only are involved in this controversy. These claims are as follows:

"20. The combination, in a grain binder, of moving butt-

adjusting mechanism, and the board d^1, substantially as described.

"21. The combination of the swinging butt-adjuster, the arms d^2, d^3, and d^4, and the board d^1, pivoted to the swinging butt-adjuster, substantially as described."

The peculiar feature of this portion of the patent is in the attachment to a butt-adjuster, such as is described in the Bullock & Appleby patent — that is, upon the stubble side of the elevator, of a board pivoted to the end of the movable butt-adjuster to bear against the butts of the sheaf of grain, after it passes the butt-adjuster proper, and while it is being acted upon by the binding mechanism. This board d^1 is described in the patent as "a thin board or plate of metal, as wide as the adjusting canvas, and pivoted to the frame of the latter at its lower extremity. From this board reaches upward and inward an arm d^2. The board and frame are as one piece; but the board itself is made in two parts, so that its greater portion (which is the lower) can be removed." As the grain advances into the binding receptacle, the board bears against the butts, and holds them in an even condition, and in such a position as to insure the central binding of the bundle. In practice two forms of this extension of the butt-adjuster have been used; one consisting of a board or sheet-iron plate *rigidly* secured to the butt-adjuster at its lower end, and the other consisting of such a board or plate *pivotally* connected to the butt-adjuster at its lower end, and connected to the binder in such a way as to cause it to remain "parallel with itself" in the various positions which it assumes. In other words, when the pivotal form of extension is used the connections are such that, while the angle of the butt-adjuster with the top of the binder changes, the angle of the extension and the same board remains constant, or nearly so. Defendants' machine is provided with a moving butt-adjusting mechanism, and also with a board pivoted to the lower end of the butt-adjuster, practically identical in its construction and operation with that of the Steward patent. The defences to these claims are:

1. That claim 20 is void, in that it describes an incomplete

and inoperative invention, and if completed by reading into it the necessary specifications, the defendants do not infringe.

2. That claim 21 is not infringed by defendants' machine.

3. That both claims are void, because Steward was not the first inventor, and because substantially the same device as shown and described in the patent and referred to in the claims was in public use in the United States for more than two years before the application was filed.

As the last defence goes to both of these claims, it may properly be considered first.

The English patent to Howard & Bousfield of 1881 may be left out of consideration, because, although it antedates the Steward patent, Steward appears to have completed his invention and made a working model before the date of the English patent. His oath was accepted by the Patent Office as decisive of the fact, and a patent was issued to him upon it, and the model, which was put in evidence, was shown to have been completed as early as February, 1881.

The court below found, however, that the device in question was invented and publicly used by one Gottlieb Heller on his farm in Kansas in the harvest of 1877–78. The importance and peculiar character of the testimony upon this point will justify a somewhat extended analysis and consideration of it. Heller is a Kansas farmer, who also appears to have been for some years agent for the Beloit — later the Milwaukee Harvester Company. He testified that in 1878 he bought from an agent of the Beloit Company a combined harvester and binder, which had a travelling butt-adjuster precisely as it appears in the Bullock & Appleby patent, except that it had no construction corresponding to the board d^1 of the 20th claim. He found that when the grain was short and thin it did not work well, so that he added an extension to the butt-adjuster, to keep the straw of the bundle even at the butts. This extension, as he explained it, was first made with a piece of tin or sheet iron *nailed* on to the frame of the butt-adjuster. This arrangement proved unsatisfactory. He then says he made an extension out of sheet iron and heavy hoop iron, which would adjust and keep

straight with the butt of the bundle, and in that way it satisfied him. He illustrated this device by a rough sketch, containing much the same elements as those described in claim 21 of the Steward patent. He then produced what he claimed to be the identical device which he made in 1878, and used publicly in the harvest of that year. This device was put in evidence. He says his wife and son helped him in the harvest and drove the machine which was used to cut part of 250 acres. He also attempted to use the device the next year, 1879, but the grain was so short it proved unsatisfactory, and he took it off and elevated the grain into a wagon. In 1880 he got a new binder, which the adjustable extension did not fit, and for lack of time he put on a rigid one instead of an adjustable one, though he preferred the latter. At various times he put on rigid ones for other persons. The pivoted butt-adjuster represented in his sketch and relied upon to establish the prior use was thrown aside and lost sight of for several years, Heller never applying for a patent nor taking any steps toward the introduction of the device.

One Rubin, a neighbor of Heller's, who sold him the harvester and binder he used in 1878, went to Heller's farm in the harvest of that year to see how it worked, when Heller's son called his attention to an improvement in the butt-adjuster which he said his father had made; but he evidently did not remember whether the board extension was rigidly or pivotally attached to the adjuster, though he thought it was screwed upon the frame of the adjuster, *stiff*.

George Heller, the son, testified that his father made an extension, like the one introduced by him, for the harvest of 1878, and that the sheet-iron piece was from an old Kirby self-rake. He seemed to have put it on as a rigid extension at first, and, after using it a day or two, substituted an automatic extension, which he believes to have been the identical device put in evidence. He says his father afterwards put a stiff one on the second binder they bought.

One Edward D. Bishop saw only the rigid extension, and did not see the improved device. Rosina Heller, the wife, testified that she ran the harvester and binder in the harvest

of 1878. She testified generally to the use of the butt-adjuster, with the adjustable extension, during the year 1878.

From the testimony in reply to this it appeared that the butt-adjuster of tin or iron, said to have been first made in 1878, and which was put in evidence, bore no marks whatever of nails having been driven into it; also, that the iron extension which Heller's son swore was from a piece of a Kirby rake owned by them, and bought of a firm in Junction City, could not have been taken from a Kirby self-rake, since that pattern of rake did not contain any such sheet iron as the extension was made of. It further appeared that the extension came from a machine called the Triumph, which Heller never owned, but which belonged to another man — one Schlesener, who lived some eight or ten miles distant. It further appeared that the extension was not applied until 1880, and was then *rigidly* fastened by Heller and Schlesener to the frame of the butt-adjuster, instead of being pivotally attached as claimed by Heller. This machine was subsequently, and in 1882, bought by one Messing, whose son testified that at that time the extension was rigidly fastened to the adjuster, and so remained until the spring of 1883, when it passed out of his possession. It further appeared that Heller was an agent for the Milwaukee Harvester Company, which was making butt-adjusters with pivoted extensions, was interested in defeating the Steward patent, and took an active part in securing his testimony.

This entire evidence, taken in connection with certain damaging admissions made by Heller as to the compensation he received, both for his testimony in this case and for his concealment of certain facts in relation to another patent, throws discredit upon the whole case made by the defendant with respect to the anticipation of the Steward patent. Taking this evidence together, it falls far short of establishing an anticipation with that certainty which the law requires. As we have had occasion before to observe, oral testimony, unsupported by patents or exhibits, tending to show prior use of a device regularly patented is, in the nature of the case, open to grave suspicion. *The Barbed Wire Patent*, 143 U. S.

275. Granting the witnesses to be of the highest character, and never so conscientious in their desire to tell only the truth, the possibility of their being mistaken as to the exact device used, which, though bearing a general resemblance to the one patented, may differ from it in the very particular which makes it patentable, are such as to render oral testimony peculiarly untrustworthy; particularly so if the testimony be taken after the lapse of years from the time the alleged anticipating device was used. If there be added to this a personal bias, or an incentive to color the testimony in the interest of the party calling the witness, to say nothing of downright perjury, its value is, of course, still more seriously impaired. This case is an apt illustration of the wisdom of the rule requiring such anticipations to be proven by evidence so cogent as to leave no reasonable doubt in the mind of the court, that the transaction occurred substantially as stated. The very exhibit produced by the witness Heller contradicted, so far as it could contradict, his testimony, and the witnesses who ought to have corroborated his story, gave a version which showed it to be untrue in more than one important particular.

Under the circumstances, it would be going too far to reject his entire testimony, but giving it all the weight to which it can reasonably be entitled, it shows no more than that he affixed some sort of an extension to a butt-adjuster connected with an Appleby machine. If, as he says, in 1878, he tried a rigid extension and found it unserviceable, and subsequently, in the same season, he invented a pivoted extension, and it worked well, it is improbable that he would have cast it aside altogether at the end of the season, and taken up again the theory of a rigid extension, and applied it not only to his own, but to a number of other machines. His excuse that the binder was incapable of doing satisfactory work during the season of 1879, by reason of the shortness of the grain that season, is evidence that it was inoperative. If it had been a success, he would hardly have thrown it aside permanently. Doubtless he did use a rigid extension of some sort; but if he ever used a pivoted device at all — of which we have consider-

able doubt — his efforts in that direction must be relegated to the class of unsuccessful and abandoned experiments, which, as we have repeatedly held, do not affect the validity of a subsequent patent. *Corn Planter Patent*, 23 Wall. 181, 211; *Coffin* v. *Ogden*, 18 Wall. 120, 124.

Defendants further insist that the twentieth claim of this patent is invalid, by reason of the fact that, if the board d^1 be construed, as it evidently must, as a board pivoted to the butt-adjuster, the combination is incomplete and inoperative, because the means by which it is held and controlled are not stated in the claim; and if the additional elements, namely, the arms d^2, d^3, and d^4, be read into it, it becomes the same as the twenty-first claim, and the novelty of the claim must be made to depend upon the peculiarities of the board d^1. Admitting that additional elements are necessary to render the device operative, it does not necessarily follow that the omission of these elements invalidates the claim, or that the precise elements described in the patent as rendering it operative must be read into the claim. If Steward were in fact the first to invent the pivotal extension to a butt-adjuster, he is entitled to a patent therefor, though the infringer may make use of other means than those employed by him to operate it. *Loom Company* v. *Higgins*, 105 U. S. 580, 584. In such case any appropriate means for making it operative will be understood. Otherwise the infringer might take the most important part of a new invention and, by changing the method of adapting it to the machine to which it is an improvement, avoid the charge of infringement. The invention of a needle with the eye near the point is the basis of all the sewing machines used; but the methods of operating such a needle are many, and if Howe had been obliged to make his own method a part of every claim in which the needle was an element, his patent would have been practically worthless. We think it sufficiently appears that Steward was the inventor of the pivoted extension described in the twentieth claim; that the claim is valid, and was infringed by the defendants.

We agree, however, that the defendants made use of a different method of adjusting this extension, which is neither

the same invented by Steward, nor a mechanical equivalent of the same. We hold, therefore, that the twenty-first claim was not infringed.

But for the reasons given above the decree of the court below must be

Reversed, and the case remanded for further proceedings in conformity with this opinion.

UNITED STATES *ex rel.* THE INTERNATIONAL CONTRACTING COMPANY *v.* LAMONT.

ERROR TO THE COURT OF APPEALS OF THE DISTRICT OF COLUMBIA.

No. 689. Argued and submitted October 23, 1894. — Decided December 10, 1894.

As mandamus will only lie to enforce a ministerial duty, as distinguished from a duty that is merely discretionary, and as the duty must exist at the time when the application is made, the Secretary of War cannot be required by mandamus to sign a contract for the performance of work by a party who is already under written contract with him to perform the same work for the Government at a lower price and under different conditions.

In pursuance of an act of Congress making an appropriation for that purpose, an advertisement appeared August 6, 1892, inviting proposals for doing certain work in Gowanus Bay, New York. The work was divided into three parts, as follows: first for Bay Ridge Channel; second, for Red Hook Channel; and third, for Gowanus Creek Channel. The advertisement, moreover, stated the sums of money which were available for the work on each separate channel, and it was announced that the work must be commenced on October 1, 1892, and be completed on or before December 31, 1893. In answer to the advertisement, the relator bid upon the work. His proposition was to do it all at a uniform rate of 19.7 of a cent per cubic yard, "scow measurement," and with two dredge boats, one of which would commence work within ninety days from the awarding of the contract, and the other within