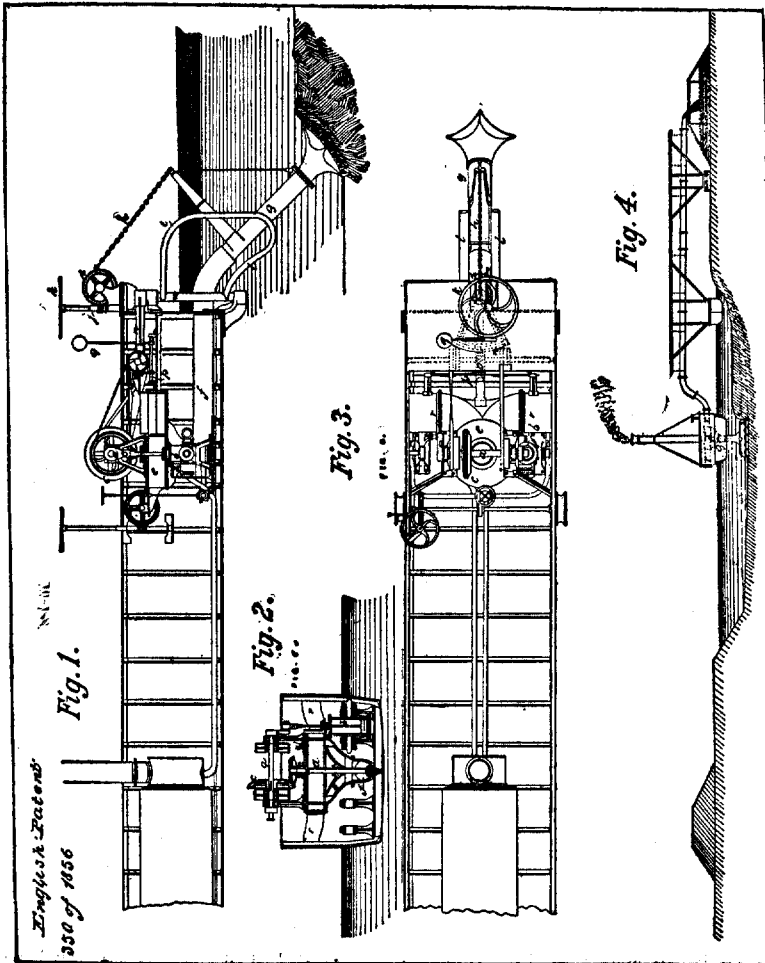


working the same. From the pump descends a suction pipe, arranged suitably to admit of its lower end being moved to and fro. The lower end of the suction pipe is fitted with a head or instrument (or the head or instrument may be separate) which, on being moved together with the lower end of the pipe, stirs or moves the mud and soil at the bottom of the river or other water, by which means the mud or soil, together with some water, will be continually raised by the pump, and the same may be allowed to run onto a bank at the side of the river or other water, or into any barge or vessel employed for carrying away such soil or mud.

"And in order that my said invention may be most fully understood and readily carried into effect, I will proceed to describe the drawing hereunto annexed.

"Description of the Drawing.

"Figure 1 is a longitudinal section of part of a vessel fitted with dredging apparatus, arranged according to my invention. Figure 2 is a transverse section, and figure 3 is a plan of the same. Figure 4 shows, on a smaller scale, an end view of the dredging vessel and apparatus employed therewith when in operation.



"a is a horizontal shaft, which is driven by an oscillating steam engine, b. c is a beveled tooth wheel on the axis, a, which drives a beveled pinion on the vertical axis, d, on which the revolving part of the rotatory or centrifugal pump, e, is mounted. This rotatory pump may be of any ordinary description. f is a pipe which passes from the pump to the stern of the vessel, where it is connected with the exterior pipe, g, by a water-tight joint of sufficient strength, so constructed that the pipe, g, may be moved about and turned in any direction. The end of the pipe, g, is expanded, and has a series of rake teeth placed round its edges. h is a chain which is wound onto the barrel, i, when it is desired to raise the pipe, g. This is done by means of a screw on the axis, j, which is worked by the wheel handle, k, and takes into a screw wheel attached to the barrel. l, l, are two guides, between which the pipe can slide freely up and down. The guides, l, l, are carried by a vertical axis, m, on the end of which is fixed the toothed quadrant, n, into which a screw, o, works. This screw is mounted on a horizontal axis, on which are two sets of fast and loose pulleys, over which two bands (one of which is crossed) pass, which bands also pass over drums on the axis, a. The bands are shifted backward and forward from the fast to the loose pulleys by forks, p, put in motion by the ball, q, the stem of which comes in contact with the arms of the quadrant, n; and, when the quadrant gets to the end of its course on either side, the ball has been brought to such a position that it falls over by its own weight, and in so doing changes the driving band, and consequently reverses the motion of the quadrant. In this way an oscillating sideway motion is given to the pipe, g. This causes the rake teeth on its end to stir up the bottom, and the mixture of earth and water so produced is sucked up the pipe by the pump, and is discharged by one or other of the horizontal pipes, r, which passes through the side of the vessel, and communicates by a flexible joint with another pipe, which discharges the matters raised into a reservoir on the bank.

"I would remark that, in order to obtain a good result, the rotatory pump should be so proportioned as to cause the water and earth to ascend the pipe with a velocity of about thirty feet per second.

"In witness whereof, I, the said Louis Schwartzkopff, have hereunto set my hand and seal, this thirty-first day of July, in the year of our Lord one thousand eight hundred and fifty-six.

Louis Schwartzkopff, [L. S.]

"From Berlin."

It is contended by counsel for complainant that the Schwartzkopff patent does not deprive the Bowers patent of its pioneer character, and in support of this contention it is urged: First. That the description contained in the publication claimed to be anticipatory must be a description of the same complete and operative art or instrument, and so precise and so particular that any person skilled in the art to which the invention belongs can construct and operate it without experiments and without further exercise of inventive skill, and that the Schwartzkopff patent does not satisfy these requirements. In this connection, it is further claimed that the description in the prior patent must be tested by the knowledge of persons skilled in the art as it existed at the date of said prior patent. Second. That if the description is sufficient to enable one to build a machine therefrom, and if such machine would operate as intended, still it operates on a different principle from, and does not show the combination of, any one of the Bowers claims. Third. That a machine built according to the Schwartzkopff patent would be inoperative and utterly impracticable, for which reason it cannot anticipate.

Before taking up these objections to the Schwartzkopff patent, it is proper to state that the burden of proof to show that the Bowers patents and inventions for dredging have been anticipated by prior patents is upon the defendant, who alleges such anticipation, and that

the proof in support of the prior patents must be clear and convincing, and place the matter beyond a reasonable doubt. As was aptly said in *Vulcanite Co. v. American Co.*, 34 Fed. 320, where the defense relied on was anticipation and want of patentable novelty:

"The evidence does not satisfy us that the complainant's contrivance to avoid the danger of slipping on smooth-surfaced composite pavements was anticipated, nor that it lacked patentable novelty. In this respect the case is doubtless near the line, and calculated to inspire doubt. To create doubt, however, is not sufficient to overthrow the presumption arising from the patent. The evidence should be satisfactorily convincing."

In *American Bell Tel. Co. v. People's Tel. Co.*, 22 Fed. 313, where it was alleged by the defendant that one Drawbaugh was the prior inventor of Bell's telephone, Judge Wheeler said:

"The complainant starts with the benefit of the presumption of law that Bell, the patentee, was the inventor. * * * Whoever alleges the contrary must assume the burden of proof. Evidence of doubtful probative force will not overthrow the presumption of novelty and originality arising from the grant of letters patent for an invention. It has been frequently held that the defense of want of novelty or originality must be made out by proof so clear and satisfactory as to remove all reasonable doubt."

This case was subsequently affirmed by the supreme court of the United States in the Telephone Cases, 126 U. S. 2, 8 Sup. Ct. 778.

In *Philadelphia Trust, Safe-Deposit & Insurance Co. v. Edison Electric Light Co.*, 13 C. C. A. 43, 65 Fed. 554, Judge Wales, speaking of a defendant who sets up new matter, said:

"The uniform practice has been to require the defendant to place himself within the exception requiring him to prove his defense beyond a reasonable doubt."

In *Manufacturing Co. v. Lynch*, 71 Fed. 410, Judge Townsend uses the following language:

"The burden is upon the defendants to support this affirmative defense by such cogent and conclusive proof as to convince this court that, if it had been presented upon the former hearing, it probably would have led to a different conclusion. In several cases the courts have held that such defense must be established beyond a reasonable doubt."

In *Electric Mfg. Co. v. Edison Electric Light Co.*, 10 C. C. A. 106, 61 Fed. 834, Judge Jenkins said:

"In the consideration of such new defense of anticipation, regard should be had to the rule that such a defense is an affirmative one, that the burden of proof is upon him who asserts it, and that the grant of letters patent is prima facie evidence that the patentee is the first inventor of the device described therein, and of its novelty."

The supreme court has stated the rule in terms not less strong. In *Coffin v. Ogden*, 18 Wall. 124, Mr. Justice Swayne, speaking of an asserted prior inventor, says:

"The burden of proof rests upon him, and every reasonable doubt should be resolved against him. * * * The law requires, not conjecture, but certainty."

This rule of evidence is approved in later cases in the supreme court. See *Cantrell v. Wallick*, 117 U. S. 689, 695, 6 Sup. Ct. 970; *Barbed-Wire Case*, 143 U. S. 275, 12 Sup. Ct. 443, 450. See, also, *Bresnahan v.*

Leveller Co., 19 C. C. A. 237, 72 Fed. 920; Patent Co. v. Donallan, 75 Fed. 287.

The defendant in this case must, therefore, establish the fact of anticipation and want of originality by clear and convincing evidence; particularly so in the case at bar, where the principal patent now sued on has been held to be valid in the case of *Bowers v. Von Schmidt*.

With reference to the first objection urged by counsel for complainant against the Schwartzkopff patent, viz. that the description is too vague, indefinite, and uncertain to be anticipatory, counsel, in his reply brief, does not press the point. I shall therefore assume, for the purposes of the case, without expressly deciding, that the description is such that a skilled mechanic of those days could, from the description, have constructed a machine embodying the ideas of the inventor. That the description in the prior patent must be tested by the knowledge of persons skilled in the art as it existed at the date of the prior patent is undoubtedly the rule. *Wilcox v. Bookwalter*, 31 Fed. 224; *Betts v. Neilson*, L. R. 5 H. L. 1.

The second point is, substantially, that the Schwartzkopff patent, assuming that the description is sufficient to enable one to build a machine therefrom, operates on a different principle from, and does not show the combination of, any one of the Bowers claims. This contention will be considered in connection with the third and last point made, viz. that a machine built according to the Schwartzkopff patent would be inoperative and utterly impracticable, for which reason it cannot anticipate. This is the controlling question, so far as the validity of the Schwartzkopff patent is concerned, and so far as it operates to deprive Bowers of the rights of a pioneer inventor.

It is the well-settled rule of patent law that an impracticable prior device, not capable of performing the function of a subsequent patented device that is practicable and useful, is no anticipation. *Coffin v. Ogden*, 18 Wall. 124; *Clough v. Barker*, 106 U. S. 160, 1 Sup. Ct. 188; *Topliff v. Topliff*, 145 U. S. 161, 12 Sup. Ct. 825; *Holloway v. Dow*, 54 Fed. 516; *Walk. Pat.* § 68. The purpose and object of the Schwartzkopff patent were for "improvements in apparatus for raising mud and soil from the bottoms of rivers and other waters." "For this purpose," as stated in the letters patent, "a centrifugal or rotary pump is fixed on board a suitable vessel, together with a steam engine or other means of working the same. From the pump descends a suction pipe, arranged suitably to admit of its lower end being moved to and fro. The lower end of the suction pipe is fitted with a head or instrument (or the head or instrument may be separate) which, on being moved together with the lower end of the pipe, stirs or moves the mud and soil at the bottom of the river or other water, by which means the mud or soil, together with some water, will be continually raised by the pump, and the same may be allowed to run onto a bank at the side of the river or other water, or into any barge or vessel employed for carrying away such soil or mud." The description in the letters patent of the drawings still further explains the mode of operation, as follows:

"Figure 1 is a longitudinal section of part of a vessel fitted with dredging apparatus, arranged according to my invention. Figure 2 is a transverse sec-

tion, and figure 3 is a plan of the same. Figure 4 shows, on a smaller scale, an end view of the dredging vessel and apparatus employed therewith when in operation.

"a is a horizontal shaft, which is driven by an oscillating steam engine, b. c is a beveled tooth wheel on the axis, a, which drives a beveled pinion on the vertical axis, d, on which the revolving part of the rotatory or centrifugal pump, e, is mounted. This rotatory pump may be of any ordinary description. f is a pipe which passes from the pump to the stern of the vessel, where it is connected with the exterior pipe, g, by a water-tight joint of sufficient strength, so constructed that the pipe, g, may be moved about and turned in any direction. The end of the pipe, g, is expanded, and has a series of rake teeth placed round its edges. h is a chain which is wound onto the barrel, i, when it is desired to raise the pipe, g. This is done by means of a screw on the axis, j, which is worked by the wheel handle, k, and takes into a screw wheel attached to the barrel. l, l, are two guides, between which the pipe can slide freely up and down. The guides, l, l, are carried by a vertical axis, m, on the end of which is fixed the toothed quadrant, n, into which a screw, o, works. This screw is mounted on a horizontal axis, on which are two sets of fast and loose pulleys, over which two bands (one of which is crossed) pass, which bands also pass over drums on the axis, a. The bands are shifted backward and forward from the fast to the loose pulleys by forks, p, put in motion by the ball, q, the stem of which comes in contact with the arms of the quadrant, n; and when the quadrant gets to the end of its course on either side, the ball has been brought to such a position that it falls over by its own weight, and in so doing changes the driving band, and consequently reverses the motion of the quadrant. In this way an oscillating sideway motion is given to the pipe, g. This causes the rake teeth on its end to stir up the bottom, and the mixture of earth and water so produced is sucked up the pipe by the pump, and is discharged by one or other of the horizontal pipes, r, which passes through the side of the vessel, and communicates by a flexible joint with another pipe, which discharges the matters raised into a reservoir on the bank.

"I would remark that, in order to obtain a good result, the rotatory pump should be so proportioned as to cause the water and earth to ascend the pipe with a velocity of about thirty feet per second."

The three primary points of Bowers' invention are: (1) A self-contained pivot, on which the dredge oscillates or swings while the excavator is working; (2) a rotary excavator, having inward delivery, in combination with a suction pipe; (3) a discharging apparatus, consisting of two parts,—one a flexibly jointed floating pipe flexibly joined to the boat, and the other a rigid land pipe flexibly joined to the floating pipe. It is in the successful combination of these three elements that the value and merit of Bowers' invention consist.

The complete operation of dredging involves several steps, and, using the language of counsel for complainant in his brief, these steps are as follows: First, the solid material in place at the bottom of the water must be cut or severed from its bed or matrix; second, after being so severed, it must be lifted above the water level; third, it must then be transported in some economical way to any desired place on land, even if that should be several miles distant; fourth, these various operations must all be carried on connectedly, simultaneously, continuously, and automatically, without unnecessary stoppages.

If the Schwartzkopff invention be useful and practical, it must successfully perform these operations. That the Bowers invention performs these operations connectedly, simultaneously, continuously, and automatically, is undisputed. The Bowers invention stands to-day at the head of the art of dredging, so far as a practical adaptation is con-

cerned. Bowers has demonstrated that his inventions can be put to a successful practical test, and that his dredging machines are a success. If the Schwartzkopff machine perform the operations of dredging successfully, it must needs be that Schwartzkopff, and not Bowers, is the pioneer in the art, and that to Schwartzkopff, and not Bowers, belongs the credit of the original invention, and that Bowers, perforce, must be relegated to the position of a mere improver, entitled to nothing more than such specific improvements as he may have invented.

A comparison of the Schwartzkopff patent with the Bowers patents shows that, while in some general features they are similar, still as to others they are dissimilar. Both have a dredge boat with a pump, and a pipe extending from the pump into the soil or matter to be dredged. Both pump up the soil or matter dredged by means of atmospheric pressure. Both, after the dredged matter is pumped up, seek to deposit the same through floating pipes on land. The features of dissimilarity are marked and radical. The Bowers patent has a spud, or a turntable, as a center of oscillation, which the Schwartzkopff patent does not appear to possess. At least, it does not appear, from the description and drawings of the Schwartzkopff patent, that it contains such a center of oscillation, and it certainly cannot be presumed that it does. In this respect Bowers undoubtedly was a pioneer. This center of oscillation and the result of its operation is to give the dredger boat a side motion, describing the arc of a circle. It moves from one side to the other while the excavator is in operation. In the Schwartzkopff patent, the dredge boat does not move, but the pipe which has the rake teeth at the end is connected by a movable joint with the pipe connecting with the pump, and is moved sidewise to and fro by machinery. That the latter method would be thoroughly impracticable to carry on any effective work seems to be established by a preponderance of the evidence. It is difficult to conceive how the movable joint connecting the two pipes could withstand the strain and pressure necessarily incident to the operation of "stirring" the soil. In the Bowers patent the pipe is rigid, and moves with the boat as it describes the arc. Furthermore, another important point of differentiation is that the Schwartzkopff cutter, if such name can be given to the rake teeth placed at the end of the suction pipe, is totally unfit to cut or disintegrate hard material. It may even be doubted whether it would operate with any great degree of utility except in very soft material. Again, the floating system of pipes, to discharge the spoil which is dredged, peculiar to the Bowers patents, is vastly superior to the awkward and impracticable device, to subserve the same purpose, of the Schwartzkopff invention.

Without entering into details, I have stated what, in my opinion, comprise the different features of similarity and dissimilarity between the Schwartzkopff and the Bowers patents. With respect to the points of similarity, viz. the boat, pump, pipe, and the method of pumping by hydraulic pressure, all these features and elements were old at the time Schwartzkopff and Bowers invented their respective devices for dredging. Therefore, Bowers was entitled to use them as much as Schwartzkopff was. As to the several points of difference, viz. spud or turntable as the center of oscillation, the rotary excavator with inward

delivery, and the discharging apparatus consisting of two parts, one a flexibly jointed floating pipe flexibly joined to the boat, and the other a rigid land pipe flexibly joined to the floating pipe, the Bowers patent is undoubtedly of a pioneer character. The devices in the Schwartzkopff machine were impracticable. They would have been useless, and could not have been operated successfully. Bowers so improved these parts that his dredging machine became a practicable machine. Schwartzkopff undoubtedly had, in a general way, the idea—the conception—of a dredging machine intended to operate as Bowers' machine does; but his idea, obviously, had not reached that degree of perfection and completeness necessary to rise to the dignity of an invention. It was not in the mere improvement of devices, which, in a general way, were similar to Schwartzkopff's, that Bowers, by his inventive ingenuity, earned the title of a pioneer in the art of dredging, which the circuit court of appeals, in the case of *Bowers v. Von Schmidt*, affirming the judgment of the court below, held he was entitled to; but it was in the successful and practical combination, in a greatly improved form, and, in some respects, different methods of operation, that the Bowers patent is justly entitled to the broad construction of a pioneer invention. His invention was not a mere step in advance of the Schwartzkopff invention, but it was, as was said in the case of *Westinghouse Air-Brake Co. v. New York Air-Brake Co.*, 11 C. C. A. 528, 63 Fed. 962, 969, a "bridge" in the progress of the art. This idea is well illustrated in that case. There it appeared that one George Westinghouse, Jr., had invented an improved apparatus, covered by patent No. 360,070, to apply and operate air brakes on railroad cars. In a subsequent patent, also obtained by him and numbered 376,837, he radically improved on his earlier patent to such an extent as to render possible and practical what before, under his previous patent, was not, namely, the immediate stoppage of long trains of cars. In a suit for the infringement of the later patent against the New York Air-Brake Company, the scope of the last invention was placed directly in issue, and it was claimed, among other things, that the improvement in the later over the previous patent was an obvious one. The circuit court of appeals, per Shipman, Circuit Judge, used the following language in that regard:

"The defendant's theory mistakes the character and scope of the invention, which was another and successful way to accomplish the work designed to be accomplished by No. 360,070, and to be effected, upon the same general plan of instantaneous brake-pipe venting, by the new means contained in the supplemental chamber. * * * In No. 360,070 the stem of the triple-valve piston directly engaged with the stem of the emergency valve, and consequently its action directly depended upon the movement of the piston. The invention in 376,837 radically departed from this method of actuating the emergency devices, by making a new piston, independent of and unconnected with the triple-valve piston. It was to be actuated by auxiliary reservoir pressure, but the particular means by which this pressure was to be permitted to exert itself, whether continuously or only when a port should be opened, do not constitute an essential part of the invention. Means must necessarily be shown in the specification, but the identical means or the special devices were not, in the language of *Machine Co. v. Lancaster*, 129 U. S. 263, 9 Sup. Ct. 290, 'necessary constituents' of the invention, either in the specification or in the claim. The skill and mechanical ingenuity of constructors of locomotives can, as will be seen hereafter, in the examination

of other patents and of the infringing devices, arrange different details of mechanical construction, by means of pistons, valves, ports, and springs, which, adopting the supplemental chamber system first conceived and embodied by the patentee, and a kindred, but not precisely the same, mechanical method for the movement of the piston, will accomplish the same result. The patentee was a pioneer, in that he designed, in No. 376,837, a new way to accomplish a desired result, but upon the same general idea which he had unsuccessfully tried to work out in the earlier patent. His later patent was the bridge, and not a mere step, which carried railroad car builders from failure to success. It is not important now to determine the grade of its pioneership, and whether it may be classed in the list of those inventions which are of the highest rank; but it was an invention created to achieve great necessities, and overcome great hindrances, and was one of wide breadth. A court would not be justified in adopting 'narrow or astute construction,' which should minimize the character of the invention, leave its real scope open to trespassers, and thus 'be fatal to the grant.' The claims of the patent do not contract the grant to narrower limits than those which the invention, as made by the patentee, actually covered; and the claims, therefore, are not limited to the precise mechanical means described in the specification, by which the supplementary piston is actuated. They compel it to be disconnected with, and to be independent of, a triple-valve piston, and to be actuated by pressure from an auxiliary reservoir by some means equivalent to the means which are described in the specification. The rule which permits, and indeed compels, courts to give a wide range to the equivalents which a broad or pioneer patent can include, is thus expressed in *Miller v. Manufacturing Co.*, 151 U. S. 186, 14 Sup. Ct. 310: 'If the invention is broad or primary in its character, the range of equivalents will be correspondingly broad, under the liberal construction which the courts give to such inventions.'

In that case, as in the case at bar, it will be seen that both patents, the earlier and the later ones, related to the same subject-matter of invention. Westinghouse so improved, by his second patent, on his first, in the production of a mechanism for the immediate stoppage of long trains of cars, that he was regarded, in his improvement, in the light of a pioneer in that art. So, in the case at bar, Bowers so improved upon the Schwartzkopff invention, in the production of a mechanism for the severing, lifting, and transporting of spoil to a distance, that he, likewise, is entitled to be regarded as a pioneer in the art of dredging. It cannot be denied that in the case cited Westinghouse possessed the same general idea of invention, for it was he who took out both patents. So, in the case at bar, it cannot be denied that both Schwartzkopff and Bowers possessed to some extent the same general idea of dredging. Both sought to clothe their inventive conceptions in substantial forms. The Schwartzkopff invention, however closely it approximates to the Bowers later and improved invention, was a failure, while the Bowers invention was a success. In other words, what was unsuccessful under the Schwartzkopff patent was rendered successful by the advent of the Bowers invention.

The case just cited, and the same patents, came up for consideration in the subsequent case of *Westinghouse Air-Brake Co. v. Great Northern Ry. Co.*, in the circuit court of appeals for the Second circuit, reported in 31 C. C. A. 525, 88 Fed. 258, 262. Shipman, Circuit Judge, also delivered the opinion of the court in this case, and in reiterating to some extent the views expressed by the court in the case of *Westinghouse Air-Brake Co. v. New York Air-Brake Co.*, supra, said:

"The question of infringement depends upon the correctness of the construction which was given to the patents in the *New York Air-Brake Case*,

supra. The former opinion of this court was based upon the position that the improvement shown in patent No. 376,837 was a marked and successful advance upon the invention described in No. 360,070, and that the later patent was entitled to a broad construction."

But it appears that there had been introduced in evidence British letters patent to George Westinghouse, Jr., No. 4,676, applied for March 29, 1887, accepted April 29, 1887, which described the invention of letters patent No. 360,070, and which said, further:

"It is obvious that it [the stem of the emergency valve] might be worked, as described, by a separate piston in a cylindrical cavity communicating on the one side of the piston with the auxiliary reservoir, and on the other side with the train pipe."

It was contended that this paragraph described the appellant's valve, showed that the change from 360,070 (which was applied for November 19, 1886) to 376,837 was an obvious one, and, therefore, that the former conception of the inventive character of the improvements should be modified. With respect to this claim the court said:

"The successful character of the invention described in the later patent has been universally recognized, in the litigations upon it, by the witnesses on both sides, including Mr. Massey, the inventor of the valve which is the subject of this suit, and by the courts in the Boyden Brake Cases (66 Fed. 997; 25 U. S. App. 475, 17 C. C. A. 430, and 70 Fed. 816); and its importance at the date of the invention, in view of the practical failure of the brake mechanism of the previous patent, in the tests upon long freight trains, cannot be doubted. The prophetic suggestions in English patents of what can be done, when no one has ever tested by actual and hard experience and under the stress of competition the truth of these suggestions, or the practical difficulties in the way of their accomplishment, or even whether the suggestions are feasible, do not carry conviction of the truth of these frequent and vague statements. The nature and character of the invention of 376,837 were, in the record heretofore before this court, put to rigorous tests by examination and cross-examination in court, and the result which was then reached is not shaken by merely a single sentence in the English patent."

This language is peculiarly applicable to the introduction in this case of the English letters patent issued to Schwartzkopff in 1856, as being anticipatory of the Bowers inventions. The rule of law which gives to the Westinghouse improved air brake the character of a pioneer invention is found in the multiple switchboard for telephone exchanges (*Western Electric Co. v. Capital Telephone & Telegraph Co.*, 86 Fed. 769), and in the overseaming sewing machine (*Willcox & Gibbs Sewing-Mach. Co. v. Merrow Mach. Co.*, 93 Fed. 206). The improved combination of Bowers' inventions rendered dredging so expeditious and superior over former methods and devices that he is entitled, in the patent law, to the position of a pioneer in the art of dredging, unless it be clearly established by the defendant that the Schwartzkopff patent of 1856 comprehended the same idea, and was so far developed at that time that it was, to all intents and purposes, or could have been made by mere mechanical skill, a practical and successful invention. This principle, which must govern this case, is nowhere better stated than in *Coffin v. Ogden*, 18 Wall. 120, where the following language was used:

"The invention or discovery relied upon as a defense, to be anticipatory, must have been complete, and capable of producing the result sought to be accomplished; and this must be shown by the defendant. The burden of

proof rests upon him, and every reasonable doubt should be resolved against him. If the thing were embryotic or inchoate, if it rested in speculation or experiment, if the process pursued for its development had failed to reach the point of consummation, it cannot avail to defeat a patent founded upon a discovery or invention which was completed, while in the other case there was only progress, however near that progress may have approximated to the end in view. The law requires, not conjecture, but certainty. If the question relate to a machine, the conception must have been clothed in substantial forms, which demonstrate at once its practical efficacy and utility."

There is another feature of this case, bearing upon the Schwartzkopff patent, which militates, in my judgment, very much against the practical utility of that invention, and that is that it does not appear ever to have been used. While the failure to put an invention to use may not be conclusive of its utility, still it is a circumstance to be considered, as against the practical utility of the machine.

In *Smith v. Vulcanite Co.*, 93 U. S. 486, 495, it was said by the court:

"We do not say the single fact that a device has gone into general use, and has displaced other devices which had previously been employed for analogous uses, establishes in all cases that the later device involves a patentable invention. It may, however, always be considered; and, when the other facts in the case leave the question in doubt, it is sufficient to turn the scale."

In *Loom Co. v. Higgins*, 105 U. S. 580, the patented device at issue consisted in a slight modification of existing mechanism, and it was contended that such slight change did not constitute a patentable invention. The supreme court, in declining to entertain this view as to the patent involved in that case, used the following language:

"It is further argued, however, that, supposing the devices to be sufficiently described, they do not show any invention, and that the combination set forth in the fifth claim is a mere aggregation of old devices already well known, and therefore it is not patentable. This argument would be sound if the combination claimed by Webster was an obvious one for attaining the advantages proposed,—one which would occur to any mechanic skilled in the art. But it is plain, from the evidence, and from the very fact that it was not sooner adopted and used, that it did not for years occur in this light to even the most skillful persons. It may have been under their very eyes; they may almost be said to have stumbled over it; but they certainly failed to see it, to estimate its value, and to bring it into notice. Who was the first to see it, to understand its value, to give it shape and form, to bring it into notice and urge its adoption? is a question to which we shall shortly give our attention. At this point we are constrained to say that we cannot yield our assent to the argument that the combination of the different parts or elements for attaining the object in view was so obvious as to merit no title to invention. Now that it has succeeded, it may seem very plain to any one that he could have done it as well. This is often the case with inventions of the greatest merit. It may be laid down as a general rule, though perhaps not an invariable one, that, if a new combination and arrangement of known elements produce a new and beneficial result never attained before, it is evidence of invention. It was certainly a new and useful result to make a loom produce 50 yards a day when it never before had produced more than 40; and we think that the combination of elements by which this was effected, even if those elements were separately known before, was invention sufficient to form the basis of a patent."

In *Krementz v. S. Cottle Co.*, 148 U. S. 556, 560, 13 Sup. Ct. 721, it was said:

"It was also made to appear that the advantages of the new button were at once recognized by the trade and by the public, and that very large quantities

have been sold. The argument drawn from the commercial success of a patented article is not always to be relied on. Other causes, such as the enterprise of the vendors, and the resort to lavish expenditures in advertising, may co-operate to promote a large marketable demand. Yet, as was well said by Mr. Justice Brown, in the case of Consolidated Brake-Shoe Co. v. Detroit Steel & Spring Co., 47 Fed. 894, 'when the other facts in the case leave the question of invention in doubt, the fact that the device has gone into general use, and has displaced other devices which had previously been employed for analogous uses, is sufficient to turn the scale in favor of the existence of invention.'"

Other cases to the same effect are Consolidated Safety-Valve Co. v. Crosby Steam Gauge & Valve Co., 113 U. S. 157, 5 Sup. Ct. 513; Magowan v. Packing Co., 141 U. S. 332, 12 Sup. Ct. 71; Barbed-Wire Case, 143 U. S. 275, 12 Sup. Ct. 443, 450; Gandy v. Belting Co., 143 U. S. 587, 12 Sup. Ct. 598; Topliff v. Topliff, 145 U. S. 156, 12 Sup. Ct. 825.

Certain other letters patent have been introduced in this case as being anticipatory of the Bowers patents, but, after a careful examination of them and comparison with the Bowers inventions, I do not find that the contentions of counsel for defendant with respect to them can be sustained.

Having determined that the Schwartzkopff patent does not anticipate the Bowers inventions, and that none of the other letters patent introduced by the defendant anticipate Bowers' patents, the conclusion logically follows that Bowers, upon the evidence presented in this case, has sustained his claim as a pioneer inventor in the art of dredging, and that he is entitled to a broad and liberal interpretation in the construction of his claims. He is, therefore, entitled to treat as infringers all who employ substantially the same means to accomplish the same results, notwithstanding the subsequent machine may, and does, contain improvements in separate mechanism which go to make up the machine. McCormick v. Talcott, 20 How. 402; Railway Co. v. Sayles, 97 U. S. 554; Clough v. Barker, 106 U. S. 166, 1 Sup. Ct. 188; Consolidated Safety-Valve Co. v. Crosby Steam Gauge & Valve Co., 113 U. S. 157, 5 Sup. Ct. 513. But any subsequent inventor could, without infringement, accomplish the same result by substantially different means,—means which are clearly without the pale of the doctrine of equivalents. McCormick v. Talcott, 20 How. 402; and cases cited supra.

It is substantially conceded that, if Bowers be considered a pioneer in the art of dredging, and his inventions of a pioneer character, the machine of the defendant does infringe. Defendant's machine is now called and known by the name of the "Oakland." It appears to have been originally named the "Atlas." It was built by the Golden State & Miners' Iron Works, and was originally sold to the Ballona Bay Harbor & Improvement Company, from which it was purchased by the defendant. Judge Hanford, in granting an injunction in Bowers Dredging Co. v. New York Dredging Co., 80 Fed. 119, relating to this same dredger of the defendant now involved in the case at bar, said:

"The circuit court of appeals gave to the Bowers patents a broad construction, and held machines constructed according to the specifications of the Von Schmidt patents to be infringements. In comparing the different machines, it is very difficult for me to find infringement in the Von Schmidt machine, and not in the dredger 'Oakland.'"

To take up each claim sued upon in detail, and demonstrate that the defendant's dredging machine infringes them, would take up too much time and space. The pivotal point, which it has been my purpose to ascertain and determine, was whether or not Bowers was the original inventor of the combination of a dredge boat having a self-contained pivot forming a center of horizontal oscillation, with devices for swinging and working the boat upon said pivot, in combination with a suction pipe, exhausting apparatus, and rotary excavator with inward delivery, and a discharging apparatus for removing the spoil,—whether he was a pioneer in the art of successful hydraulic dredging, and, therefore, entitled to a broad and liberal interpretation for his claims, or whether he was a mere improver, having obtained the general idea from a prior inventor, like Schwartzkopff, and merely improving upon the prior invention. Having determined that he is a pioneer inventor in the art of dredging, and entitled to a broad and liberal interpretation of his claims, it is unnecessary to pursue the subject further.

A decree will be entered in favor of the complainant upon the following claims: Claims 9, 10, 11, 12, 16, 22, 25, 53, 54, 59, and 87 of letters patent No. 318,859; claims 3 and 5 of letters patent No. 318,860; claims 1, 12, 13, and 15 of letters patent No. 372,956.

NELSON et al. v. FARMER TYPE-FOUNDING CO. et al.

(Circuit Court, S. D. New York. December 16, 1898.)

1. PATENTS—ANTICIPATION—MEASURE OF PROOF REQUIRED.

That a prior device operated in the same manner, so as to constitute an anticipation which will defeat a patent for a later one, must be proved beyond a reasonable doubt.

2. SAME—IMPROVEMENT IN TYPE-CASTING MACHINES.

Neither the Hochstedt, Wenzel & Heinebach patents, Nos. 352,869 and 354,060, nor the Rettig patent, No. 354,935, all for improvements in type-casting machines, were anticipated by the device shown in the Mason patent, No. 187,880, for an improvement in type molds.

This was a suit in equity by Robert W. Nelson and others against the Farmer Type-Founding Company and others, for the infringement of certain patents.

Charles S. Burton, for plaintiffs.

Jerome Carty and Harvey S. Knight, for defendants.

WHEELER, District Judge. Metal type is cast in a machine having a mold of upper and lower blocks, into which the molten metal is forced through a funnel-shaped part of the mold at the foot of the type, and fills the mold, including this part, whereby the face and body of the type, with this excrescence attached, are cast. A forward movement of the mold separates the casting from the metal. Formerly an upward movement of the upper block carried the casting, held it in slightly by projecting pins, away from the lower block, until the end of the casting separated from the metal,