

December 25, 1888, to Michael Clune, of Indianapolis, Ind. The claim reads as follows:

"A bed-lounge composed of two folding sections hinged together, the lower one having a back rigidly attached thereto, and a fastening for the same, composed of two parts, one of which is fixed at or near the top of the inside of the head of the upper folding section, the other at or near the top of the back, so that when the lounge is folded up the two parts will engage with each other, securing the headrest of the frame to the back, substantially as shown and described."

As stated in the opinion of the court below (77 Fed. 205):

"The only novelty in the combination claimed by the complainant consists in the use of an eye on the headrest of the lounge, and a pin or hook on the back, so placed that the two will automatically engage when the two sections are folded together, and thus hold the back firmly in place."

We quite agree with that court that, in view of the common and diversified uses of similar devices for the accomplishment of similar purposes, it is impossible to find patentable novelty in the invention. The Braun patent, No. 177,462, shows a similar construction, designed to secure the upper head section on the lower stationary section, or, in other words, to prevent horizontal movement of the upper section; but it needed no power of invention to put into the groove in the back of Braun's lounge a pin, which should engage automatically with a hook, or spring catch, or other device there used, for the further purpose of holding the back firmly; especially since devices composed of two parts, but which were engaged by hand, had been used theretofore upon lounges for the same purpose. The decree is therefore affirmed.

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#### UNIVERSAL WINDING CO. v. WILLIMANTIC LINEN CO.

(Circuit Court, D. Connecticut. July 27, 1897.)

##### 1. PATENTS—PRESUMPTIONS FROM GRANT—ANTICIPATION.

The grant of a patent raises a presumption of operativeness and of some utility, and, if prior, though it be a mere paper patent, it may anticipate, if it sufficiently discloses the principle of the alleged invention. Such a patent may also be relevant, to show that another device does not infringe such an invention, but is merely an improvement on the prior patent, or an application thereof to a new purpose.

##### 2. SAME—CONSTRUCTION OF CLAIMS—INFRINGEMENT—MACHINE FOR WINDING COPS.

The Wardwell patent, No. 480,157, for a machine for winding cops, construed, and *held* not infringed as to claims 1, 2, 3, and 4; and *held*, also, that claim 4 cannot be sustained in view of the prior state of the art, if so construed as to embrace unequal cone-pulleys as an equivalent of the means therein claimed.

##### 3. SAME—ANTICIPATION—MUSEUM EXHIBITS.

Proof that long prior to the granting of a patent for a cop wound in a particular way several specimens of cops wound, so far as can be seen from their exterior layers, in exactly the same way, had been imported from the Fiji Islands, and kept on exhibition in the National Museum at Washington, and were known to many persons prior to the date of the alleged invention, is sufficient evidence of anticipation.

##### 4. SAME—PROCESS AND PRODUCT PATENT COPS.

The Wardwell patents, Nos. 480,158 and 486,745, for a method of winding cops, and for a cop, respectively, are void for want of patentable novelty.

This was a suit in equity by the Universal Winding Company against the Willimantic Linen Company for alleged infringement of three patents covering, respectively, a machine for winding cops, a method of winding cops, and a cop wound according to such method. On final hearing.

Dickerson & Brown, for complainant.

Mitchell, Bartlett & Brownell, for defendant.

TOWNSEND, District Judge. Complainant herein, at final hearing on the usual bill and answer, prays for an injunction and accounting by reason of the alleged infringement of patents No. 480,157, for an apparatus for winding cops, No. 480,158, for a method of winding cops, both dated August 2, 1892, and of No. 486,745, for a cop, dated November 22, 1892, all of said patents having been issued to Joseph R. Leeson as assignee of Simon W. Wardwell, Jr., and duly assigned to this complainant. A cop—the subject-matter to which these patents relate—consists generally of a ball or roll of thread or rope wound in helixes or spirals on a spindle. In most of the ordinary and earlier cops the successive coils of thread were irregularly wound upon the spindle, without any attempt to arrange the threads parallel to each other. The alleged invention of the cop patent No. 486,745 is therein stated by the patentee to consist in a “cop wound \* \* \* so as to have greater uniformity, density, and compactness, and so as to facilitate the unwinding, and prevent tangling, and insuring other advantages.” Before discussing the patents in suit, it will be necessary to make some general statements concerning the art. Irrespective of certain alleged anticipations, to be hereafter considered, there were found in the prior art various forms of cops, distinguished by differences in pitch or angle of the thread and the relations of the threads to each other. Certain of these winds are designated ball wind, cross wind, surface wind, Z wind, spool wind, Spach wind, etc. It is unnecessary to state their distinguishing characteristics. A special form of wind of the prior art is known as the half wind or crescent wind. The wind of the patents in suit is known as the V wind or Wardwell wind. In each of these two winds the thread is ordinarily wound on a core, without any head at the ends, from one end of the core to the other in the direction of a helix or spiral, and is then so reversed as to form a knuckle or abrupt bend, and wound in a reverse helix or spiral to that end of the core where the winding was started. In each the thread is again reversed to form another such knuckle, and, passing across the first helix, is wound in a second helix, parallel and generally close to the first. In each, complete parallel layers will thus be laid one above the other, forming a solid cylindrical cop alike throughout. The complainant differentiates the crescent wind as follows: (1) It is a modified form of ball wind. (2) It is not wound in spirals, but in the form of a semi-circle or semiellipse, and will therefore in its first courses slip towards the middle of the core, and therefore the successive threads may not lie parallel to each other. (3) The threads will never cross each other intermediate of the ends of the core, and hence do not in-

terlock, and therefore the cop will not be cylindrical in form, and will easily lose its shape. (4) This wind is adapted only for winding extremely small cops. Whether the crescent wind is a modified ball wind is immaterial except in so far as under such designation complainant's expert includes it in the foregoing criticisms of ball winds in general. The criticisms of ball winds generally do not necessarily apply to the crescent wind. The essential feature of the Wardwell wind, as claimed by complainant, is that the wind is spiral in the sense that "the thread turns more than half a revolution in extending from one end of the cop to the other" at such an angle "that when the complete spiral is laid—that is, when the thread has been wound to the end of the cop and has returned—the angle of delivery and return shall be such that the thread will remain where it is put." The distinguishing feature of the crescent wind, as claimed by complainant, is that the thread, although wound in substantially the same direction as in the Wardwell wind, is not spirally wound, because the angle is such that the thread turns only one-half a revolution in extending from one end of the cop to the other, and therefore "the turns of the thread constitute substantially circles or rings at an angle to the axis of the holder or tube." This difference of angle is claimed as Wardwell's invention and as the basis of the alleged differences in results. The line between what is thus included within and excluded from the Wardwell invention may be shown by the following statements:

Complainant's expert Foster first says:

"I was wrong in stating that a complete revolution was necessary to lay such a spiral or helix as is required by the patent."

Later he says:

"Q. Then, if I understand you, everything else being alike in machine, in wind and in cop, a spiral crossing in five-eighths of a turn would not exclude the Leeson invention, a spiral crossing in four-eighths of a turn would exclude the Leeson invention, and as to a spiral crossing in nine-sixteenths of a turn you are somewhat in doubt? A. So far as I can tell without seeing the cop, a spiral crossing in five-eighths would have reverse spirals interlocking between the ends, and would embody this feature of the Wardwell invention. I do not recognize that there would be a spiral at all at four-eighths of a turn, because that would be a one-half turn, winding what I have pointed out as a ball-wind cop. As regards a spiral of nine-sixteenths, if the thread was fine, and the cop relatively long, this would embody this feature of the Wardwell wind if it caused the reverse spirals to be interlocked between their ends."

Wardwell himself, in the patents in suit, does not claim that any exact pitch or number of turns in the spiral constitutes his invention. On the contrary, he says, in No. 486,745:

"I make use of a tube of any suitable character, and I wind the thread, X, thereon, with any suitable number of turns or coils to the length of the tube."

In No. 480,157 he says:

"As a result of this operation, the reversal of the movement of the guide takes place, not upon the completion of a rotation (or fraction or multiple of a rotation) of the holder, but after, and only after, the holder has reached the point in its revolution beyond that necessary to complete such movement, and beyond that point which it occupied at the time the guide was reversed upon its preceding reversal of movement, so that the thread held by the guide is not

started on its return winding until it has been laid over onto the outer side of the previous coil."

The crescent cops do not necessarily slip towards the middle of the core. Whether such a wind thus slips depends upon the angle at which it is wound, and the abruptness of the reversal, and may also depend upon whether the core is rough or smooth. The crescent cops, as originally wound, were small sewing-machine cops, and in them the thread did not cross intermediate the end of the core. This point will be discussed hereafter. Wardwell created the cop in the method and by the machine which are the subjects of the three patents in suit. Complainant claims that therein he first disclosed the angle at which threads could be so laid on a cylinder that they would lie parallel to, and generally in contact with, each other, without slipping, and would cross each other and interlock intermediate the ends, and the method and means for accomplishing said result, and that he was the first inventor thereof. Patent No. 480,157 covers Wardwell's machine for winding the cops of No. 486,745 by the method of No. 480,158. The claims alleged to be infringed are the following:

"(1) In a cop-winding machine, the combination, with a revolving holder for supporting the cop, and with a reciprocating thread guide supported to move in a course parallel to the axis of the cop, of mechanisms adapted to give the holder an increment of movement at each rotation, for the purposes set forth. (2) A machine for winding cops, provided with a holder for the cop, and a reciprocating guide for the thread supported to move parallel to the axis of the cop and outward as the cop increases in diameter, and means for turning the holder and for reciprocating the guide, and mechanisms for varying the relative movements of the holder and guide to insure an increment of movement to the holder at each rotation, whereby each reversal of the movement of the guide takes place after the holder has turned beyond the point of its revolution occupied at the moment of the preceding reversal of the movement of the guide, substantially as set forth. (3) A machine for winding cops, provided with a revolving holder for supporting the cops, and with a reciprocating thread-guide and means for varying the relative movements of the thread-holder and guide, constructed substantially as described, to secure each successive reversal of the movement of the guide at the outer end of the holder after, and only after, the holder in its rotation has reached a point beyond the point reached at the moment of the preceding reversal of the movement of the guide at such end substantially as set forth. (4) In a cop-winding machine, the combination of a guide and means for imparting to the same a regular reciprocating movement parallel to the cop, and a holder for supporting the cop, and means for imparting to the same a progressive rotary movement at each rotation, substantially as set forth."

The patented machine comprises a cop holder in the form of a cylinder, and a thread-guide operating close to said cylinder, and so arranged that as the cylinder rotates the thread-guide reciprocates in a line parallel to the axis of the cylinder, and so that, as the thread is brought to either end of the cop thus formed, each succeeding coil shall be abruptly bent at a point just beyond the bend in the last preceding coil, and shall form such a bend or knuckle beyond the preceding one that the thread shall thereafter lie parallel to the thread of the preceding coil, and preferably in direct contact therewith. The patentee does not limit himself to any precise means for accomplishing this result. He describes and illustrates, however, a machine mounted on a frame provided with a cylinder supported be

tween two disks on conical hubs, which turn loosely on a shaft driven at a uniform speed by suitable gear and pinion devices.

In view of the conclusion reached that the Wardwell machine involved invention, it is unnecessary to describe the mechanical details, fully stated in said specification, whereby the desired result may be accomplished. For the purposes of this case it suffices to say that by means of a cross-arm carrying a lever attached to a pivoted spring pawl and a rock shaft carrying arms, one of which is connected with said lever, while the other extends over a cam upon a sleeve turning on said driven shaft, not only do one of said disks and said pawl revolve with said shaft, but the revolution of said sleeve is retarded, and one of the arms is released, and throws said pawl forward. The patentee says:

"The pawl therefore derives its motion from two sources: First, from the rotation of the shaft and the cross-arm carried by the shaft, which would give to the pawl and to the disk the same rate of rotation as the shaft; second, from the cam which imparts to the pawl a progressive or forward traveling movement in excess of that derived from the shaft, so that at the completion of each revolution of the shaft, or upon each successive reversal of the movement of the guide, the pawl and the disk will have traveled not only the extent of a complete revolution (or a complete fraction or multiplication of a revolution), but will also have moved an additional extent corresponding to the movement imparted to the pawl by the cam."

The patentee also suggests that provision might be made for a momentary action of the cam, instead of the described gradual and constant movement, by the substitution of a radial pin for said cam.

The features claimed as distinctive of the Wardwell machine are: (1) The rotatable cop holder; (2) the reciprocating thread-guide, so operated as to be constantly close to the cop; (3) the means for so rotating the cop holder relatively to the thread-guide that the thread will be deposited in helixes or spirals of such a pitch that they will not slip on the cop holder; "(4) a cam, or equivalent device, reciprocating the thread-guide, and so constructed that it will, at the ends of the reciprocations of the thread-guide, reverse it with that celerity which is necessary for producing the knuckles or abrupt bends;" "(5) means for producing an increment of motion, whereby the thread, about the time of being reversed, will be made to cross a portion of a previously laid angle or abrupt bend, in order that after reversal the thread may be alongside of and parallel to the latter." The defendant's machine differs materially in construction from complainant's machine. It has necessarily a revolving cop holder, a reciprocating thread-guide, and devices for so adapting their movements to each other as to produce the same result as is produced by complainant's machine. But the contention of the defendant is that its machine does not infringe, because it produces this result without the use of the essential elements claimed in complainant's patent. The complainant's patent, it will be remembered, describes two sources from which the pawl derives its motion, and by means of which an increment of motion is imparted to the thread-guide at each succeeding reversal of movement. The result of this twofold speed relationship, says the patentee, "is the same whether the rotating cop gains sufficient at each revolution to carry the thread being laid

across that previously laid at the end of the cop or the cop rotates uniformly without gain, and the guide, as it reaches each end of the cop, is held for a longer time than is necessary for the cop to complete its rotation." In the defendant's machine, the desired result is secured by regulating the speed relation between the spindle and thread-guide by means of the relative proportions of the wheels which connect these two shafts to the driving shaft. The defendant, therefore, does not use the means for the throw or increment of motion described in complainant's patent. But the patentee states that he does not confine himself to the described or preferable construction; and he describes an ingeniously devised apparatus, which produces an improvement upon prior products.

The issue, therefore, may be fairly reduced to the scope of the claims in suit. For the purposes of this discussion it will be necessary to further examine the prior art in general, and the prior experiments of Wardwell and others, and their results. The Morrison use in 1879, if sufficiently proved, would invalidate all of complainant's patents. But it would be unsafe to find anticipation upon such doubtful evidence. Morrison, who swears that he made an anticipating machine, was an employé of defendant. He built only one original machine. It is not proven that the model is in certain essential parts like the original. The persons for whom it was made abandoned its use, and took a license under the three patents in suit. Patent No. 146,210, granted January 6, 1874, to Samuel K. Smith, shows a spooling machine adjusted for winding threads close together with coils inclined so as to cross each other back and forth the length of the spool. The patent does not show such an apparatus as that of the patent in suit for forming the knuckles or bends, nor would it, without modification, make a cop, such as is made by the machine of the patent in suit. But, in connection with its spindle and thread-guide, it shows, for giving to said guide its reciprocating motion, a grooved cam, an arm projecting into said groove, and two conical pulleys with a belt for connecting the cop-turning mechanism with the guide-reciprocating mechanism, like those shown in defendant's machine. It is a paper patent. If it does not anticipate complainant's machine, it bears directly, if not decisively, upon the question of infringement. The grant of a patent raises a presumption of operativeness, and of some utility, and, if prior, even though it be a mere paper patent, it may anticipate, provided it sufficiently discloses the principle of the alleged invention. Such prior patent may be relevant also to show that another device is not an infringement of such alleged invention, but is merely an improvement upon the prior patent, or an application thereof to a new purpose. *Pickering v. McCullough*, 104 U. S. 319; *Dashiell v. Grosvenor*, 162 U. S. 432, 16 Sup. Ct. 805. In this case the conclusion reached upon all the evidence is that the defendant's device is such an improvement or adaptation of the art existing at the date of the invention in suit. Neither the drawings nor the description of the Heal British patent discloses the whole machine. The drawings further fail to show the speed relation between guide and spindle, and the thread is delivered from the guide at a considerable distance from the cop. But earlier pat-

ents, and notably the British patent to James Combe of 1867, show the thread-guide bearing directly upon the cop, and this Combe patent illustrates the positive connection of thread-guide with a cam, and of uniform pitch rotating uniformly with respect to the rotation of the spindle, which are characteristic features of defendant's machine. Neither the Heal nor the Combe patent shows the variation of rotary movement of spindle or the added movement or increment of motion covered by the patent in suit. Neither of these machines, therefore, is like the patent in suit. But no reason is shown why a skilled mechanic could not supply from the then prior art the necessary connection between spindle and thread-guide shaft, or provide means for actual contact between the the thread-guide and spindle at the point of delivery of the thread; and complainant's expert does not deny that such modifications could be made, or assert that it would require inventive skill to make them, or that, if made, they would constitute invention.

A mass of testimony has been introduced as to the date of Wardwell's conception and reduction to practice of his invention. The evidence as to Wardwell's experiments shows that, having been engaged by complainant to make a machine to wind cops, he conceived first the idea of a method of so laying parallel threads and crossing them at an abrupt angle as to make a compact cop; that later he devised two machines, the earlier of which, on account of its complicated construction, was abandoned in an incomplete state, and the later of which was finished in October, 1891. This machine embodies the construction shown and claimed in the patent in suit. Wardwell's earlier drawings and both machines show the means employed for securing the increment of motion which is a characteristic of his patent. As to this he testifies as follows:

"Q. State whether or not there is any difference in the result of the two arrangements of the pawl shown in the drawing and in the patent. A. The results were substantially the same. The pawl operated to draw or push the cop in excess of the motion imparted by its shaft."

It is significant, as bearing upon the claim as to Wardwell's conception of a V wind as distinguished from a ball wind, that in complainant's exhibit "Wardwell's first machine drawing," the sharp angles of the cam are such as to suggest a ball wind, and the cop therein illustrated is a ball-wind cop. The defendant has been experimenting in cops since 1889. It claims that prior to October, 1890, the superintendent of its factory showed the Merrick cop, to be hereafter considered, to one of its machinists,—Palmer,—and asked him whether he could wind such a cop, and that in October, 1890, he did make such a cop by the use of a crude device having a flyer or thread guide on an angle with the spindle; that he continued these experiments, and in 1891 produced one machine, and in 1892 another improved machine, which made the cop of the patent in suit. It is unnecessary to discuss the bearing of this evidence upon the claim of anticipation. It is relevant, however, as throwing light upon the problem presented, and the means adopted by different persons for its solution.

If now we again compare the patented machine with defendant's machine, we shall find in the former the completed practical devel-

opment of the original conception of the increment of motion to secure the parallelism of threads, the knuckle or abrupt bend, and the other advantages of the Wardwell cop. We shall find the embodiment of this invention—First, in the rotating cam shaft operating the thread-guide through its cam and the cop shaft, and said cop shaft rotating the spindle; second, in two distinct speed relationships, one determined by the relation between the cop-shaft and cam-shaft, the other the “relative movement of the tube holder with respect to its shaft or the thread-guide cam with respect to its shaft, which causes an increment of motion.” The patentee’s description of this increment of motion or added movement by means of motion from two sources has already been given in connection with the description of his machine. In the defendant’s machine the spindle is fastened to and revolved by its shaft, and the thread-guide is caused to reciprocate by a cam on another shaft. They are operated by means of belts, pulleys, and gears connected with the main driving shaft. Two slightly tapering pulleys with a belt provide means for adjusting the relative proportions of the speed relations between the thread-guide and the spindle. This may be accomplished by shifting the belt lengthwise of the pulleys. The differences of construction material in this connection are the loosely turning spindle holders of complainant’s machine, while that of the defendant is fast to its shaft, and the arrangement of belts and tapering pulleys in defendant’s machine, to produce the result accomplished in complainant’s machine by means of arms, pawl, cam, and geared wheel, as already described.

The question at issue is therefore reduced to one of infringement depending upon the scope of the invention. The first, second, and third claims do not cover defendant’s machine. Its mechanism is not “adapted to give the holder an increment of movement at each rotation,” nor does it provide means “whereby each reversal of the movement of the guide takes place after the holder has turned beyond the point of its revolution occupied at the moment of its preceding reversal of the movement of the guide, substantially as set forth.” But the fourth claim is much broader in its terms, and covers “the combination of a guide and means for imparting to the same a regular reciprocating movement parallel to the cop, and a holder for supporting the cop, and means for imparting to the same a progressive rotary movement at each rotation, substantially as set forth.” And it will be remembered that the patentee has, in his specification, stated that he does not limit himself to the preferable forms therein described, and that “different means may be employed for causing such a relative variation of movement as will effect the above-described result.” The defendant contends that its device for regulating the relative motion between thread-guide and cop was old and well known in this and allied arts at the date of the patent in suit. The prior art already considered has shown a single-speed relationship, but has not been discussed in connection with defendant’s construction for regulating the relation of speed. Patent No. 245,373, granted to J. Hargraves in 1881, and one of the British patents granted to J. C. & F. A. Spach in 1885, show cone pulleys and a belt thereon, so arranged that, by shifting it lengthwise of said pulleys, the relative



speeds of the two driving shafts may be adjusted. Further evidence as to defendant's construction is found in the so-called "Merrick use." Upon final hearing, defendant, in connection with proof of an alleged prior use by the Merrick Thread Company of certain machines and methods claimed to anticipate or limit the patents in suit, introduced two machines known respectively as "Merrick 1890 machine" and "Merrick 1890 machine showing stopover attachment." The latter machine was so provided with unequal pulleys that, if prior use and knowledge thereof in the United States had been sufficiently proved, it would have been fatal to the claims of the machine patent in suit, if not as an anticipation, at least as showing noninfringement, as will be hereafter explained. The proof of priority, however, was not so limited. Upon motion of defendant the case was opened to permit the introduction of further testimony on this point. Much of the new evidence on each side is indefinite and contradictory. Some of the witnesses are manifestly prejudiced, even if their recollection is accurate. The whole evidence as to the Merrick use, taken together, shows that in 1890, and prior to the date of Wardwell's machine invention, the Merrick Thread Company used in its mill at Holyoke, Mass., machines for making half-wind cops by the use of conical pulleys of equal size. They embody substantially the defendant's construction, except that in the latter the conical pulleys are unequal. The great preponderance of evidence is to the effect that the "Merrick 1890 machine, with stopover attachment," hereafter to be called the "Second Merrick 1890 Machine," with conical pulleys of unequal size, also was practically operated in said mill in 1890. Green, the alleged inventor, Baker, the draftsman, Prentice, a superintendent, and Hopkins, president and acting manager of the Merrick Company, interested but intelligent witnesses, testify more or less satisfactorily on this point. Of the witnesses for complainant on the reopening, Cressy is ignorant, untrustworthy, and contradicted by Mary Lipps, and by his former testimony. Mary Lipps testified that cones of different sizes might have been used on one or more of these twenty-six machines without her knowing it. Lizzie McDowell's memory is defective; and Hollingsworth is intelligent, but manifestly hostile to defendant. He testifies that he was a draftsman for the Merrick Company until December 24, 1890, and that he never saw a machine with unequal pulleys while in their employ. While, however, the weight of evidence as to said second Merrick machine so strongly preponderates in favor of defendant, I am not satisfied that it establishes the claim of anticipation beyond a reasonable doubt. It does, however, furnish substantial support to the view herein taken upon the question of infringement.

It will be recalled that the prior Hargraves patent showed a machine with conical pulleys of unequal size, capable of producing on cards a wind like that of the second Merrick 1890 machine. Furthermore, defendant's witness Green, in the first claim of an abandoned application for a patent sworn to on September 13, 1890, used the following language:

"(1) In a cop-winding machine, the combination with a winding shaft carrying a mandrel and a cone pulley of a secondary shaft carrying a cam and a

cone pulley, a vibratory thread-guiding lever operatively engaging the cam on said secondary shaft, and a belt connection between the cone pulleys on said shafts, whereby the speed of said secondary shaft can be varied at will, substantially as and for the purposes described."

This statement seems to be sufficiently comprehensive to embrace either equal or unequal conical pulleys. In view of the Spach and Hargraves patents, it would be unnecessary to specify that the relative speed relations could be varied by unequal pulleys, for that was already old. In this abandoned application reference is also made to the method of making cops of varying width, and to winding the threads upon a tube in uniform layers. The issue of infringement herein may be most directly presented by a comparison of the confessedly prior first Merrick 1890 machine with the second Merrick 1890 machine, the prior use of which is denied by complainant. In the former, by the use of a belt at the center of the equal pulleys, a half-wind cop is produced. Defendant contends that the adjusting devices of the first Merrick 1890 machine are so constructed that by shifting the belt a V wind may be produced thereon. This the complainant denies. I have not been able to satisfactorily determine this question. In the second Merrick 1890 machine the cone pulleys are of unequal size, thus providing a speed relationship which makes the V wind between the ends of the cop. This is the sole material difference in the construction and resultant operation of the two machines. It may be assumed that this modification was subsequent to the alleged Wardwell invention. It is proved that it made what is known as the "Wardwell cop." Whether the V wind, crossing intermediate the ends, was an essential feature of Wardwell's invention is very doubtful. He illustrated the half wind in his drawings. The term "V wind" is not found in any of the patents. Such crossing is mentioned only once in the three specifications. Most of the claims cover only the crossings at the end of the cop, and no reference is made to the V wind in the expert testimony in chief; and in his later patent, No. 533,934, Wardwell himself, in disclosing certain improvements on his alleged inventions already patented, illustrates and describes, not the V wind or full wind, but a wind of quarter turns, thus forcibly suggesting that his conception of his invention was not in the length, but in the character, of the spirals. It may be further assumed that it would have involved invention to thus change the size and resultant operation of the pulleys, if such change had not been in the prior art. But in the Hargraves patent, already considered, are found such pulleys used to produce said V wind upon a flat card. The considerations already suggested show that, if Wardwell's fourth claim could be so construed as to embrace all means for imparting progressive rotary movement to the cop at each rotation, it would be void by reason of lack of patentable novelty. If so construed as to include only the device described in the specification, it is not infringed.

If it be conceded, on behalf of complainant, that the proof of the alleged Morrison use is insufficient; that the date of the Morrison second machine, which contains the Wardwell invention, is not proved beyond a reasonable doubt; that the abandoned application of Green failed to describe how the variation of speeds included in the first