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Priority Paradoxes in Patent Law

Richard H. Stern*

The author here outlines the law governing the Patent Office interference proceeding for determination of the relative priority of claimants. He uses an axiomatic system to examine and illustrate the present statute and through the use of this system points out a paradox which under the existing laws allows an undesirable circularity of priorities among parties. Mr. Stern then proposes a statutory amendment eliminating this paradox.

The constitutional provision governing patents gives Congress the power to promote the progress of useful arts "by securing for limited Times to . . . Inventors the exclusive Right to their . . . Discoveries."¹ Because an "exclusive right" suggests an exclusive grant, the Patent Office interference proceeding has been created² for the purpose of determining administratively the question of priority of rights between two or more parties claiming substantially the same invention.³ This article attempts to state in terms of an informal axiomatic system the rules of law for determining priority of invention, and then examine that system to explore its possible paradoxes.⁴ Finally, an amendment is proposed to eliminate a serious paradox in the present statute, which permits the occurrence of a circularity of priorities in which *a* may be prior to *b*, *b* prior to *c*, and *c* prior to *a*.

I. THE EXISTING LAW

Interference proceedings grow out of patent applications pending in the Patent Office at the same time, each of which appears to claim

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1. U.S. CONST. art. I, § 8.

2. The interference as we know it stems from § 16 of the Patent Act of 1836, ch. 357, 5 Stat. 123; § 9 of the prior Patent Act of 1793, ch. 11, 1 Stat. 322, had provided for arbitration of conflicting claims for grants. Although the analysis which follows is couched primarily in terms of administrative proceedings to determine priority, essentially the same considerations are applied in civil actions for infringement when priority of invention is put into issue. See, *e.g.*, *Radio Corp. of America v. Radio Eng'r Labs., Inc.*, 293 U.S. 1 (1934); *Reed v. Cutter*, 20 Fed. Cas. 435 (No. 11645) (C.C.D. Mass. 1841).

3. U.S. Pat. Off. R. 201(a), 37 C.F.R. § 1.201(a) (1960).

4. WEBSTER, *NEW INTERNATIONAL DICTIONARY* (2d ed. 1958) defines "paradox":

"2. A statement self-contradictory or false.

3. Any phenomenon or action with seemingly contradictory qualities or phases." As used here, the term refers to inconsistent, contradictory, anomalous results which may follow from the interference laws as they presently stand. Cf. *Pirates of Penzance*, Act II ("How quaint the ways of Paradox! At common sense she gaily mocks!"); *Othello*, Act II, Scene 1, lines 139-40 ("These are old fond paradoxes to make fools laugh in the alehouse . . .").

the same subject matter,⁵ or else out of one or more applications which appear to claim the subject matter of a patent issued within the past year.⁶ Thus, one of the facts relevant to determining priority, the date each patent application was filed in the Office, is always known to the Office at the outset.⁷ The other significant facts, however, are usually unknown to the Office and to the party not in control of them. These are the facts which must be determined in the interference proceeding, on the basis of the evidence brought forward by the contending parties. The burden of introducing that evidence repeatedly shifts back and forth, at least conceptually, between the parties at subsequent stages of the interference proceeding. The burden of persuasion,⁸ however, remains on the party with the later filing date, the "junior" applicant.

The antiphonic quality of the interference proceeding is perhaps exaggerated in the previous paragraph, since the casting of the burden of proof back and forth between the parties is more conceptual than real. At the outset of the interference, the parties are each required to file a "preliminary statement," setting forth the facts and relevant dates as to the events determining priority.⁹ This statement acts as a bill of particulars and limits the proof of the parties to what they have alleged there.¹⁰ Thus, the issues are narrowed and it may well be possible to proceed immediately to the critical disputed issue.¹¹ Moreover,

5. To insure precise joinder of issue, it is customary for the Office to propose to one party that he adopt the identical language of his rival's claim. See U.S. Pat. Off. R. 203(b), 37 C.F.R. § 1.203(b) (1960). In any event, "claims in the same language" must be present in the applications for the interference to proceed. U.S. Pat. Off. R. 203(a), 37 C.F.R. § 1.203(a) (1960).

6. See 35 U.S.C. § 135 (1958); *cf. id.* § 102(g). If the applicant permits a year to go by after the issuance of a rival patent claiming his invention, without putting in his own claim for the subject matter, he forfeits his rights to a patent. If, however, he can show that before the one year expired he had claimed substantially the same subject matter as his rival, even though the language and scope of his claims had been slightly different from his rival's, then the applicant may precipitate an interference by adopting the language of the issued patent even after the one-year period. *In re Tanke*, 41 C.C.P.A. (Patents) 919, 213 F.2d 551 (1954).

7. In some circumstances, the true filing date is known to the Office, but the applicant is entitled to prove an earlier "effective filing date" under the provisions of 35 U.S.C. § 119 (1958) (earlier effective filing date based on foreign application).

8. This burden is the customary civil burden, the preponderance of the evidence. *Evans v. Associated Automatic Sprinkler Co.*, 241 Fed. 252, 255 (3d Cir. 1917); *Diamond v. Woodyard*, 38 C.C.P.A. (Patents) 816, 823, 186 F.2d 729, 734 (1951). *But cf. Reusch v. Fischer*, 18 C.C.P.A. (Patents) 1357, 49 F.2d 818 (1931) (attorney-client).

9. U.S. Pat. Off. R. 215-17, 37 C.F.R. §§ 1.215-17 (1960).

10. U.S. Pat. Off. R. 223-25, 37 C.F.R. §§ 1.223-25 (1960).

11. See *Elnore v. Schmitt*, 47 C.C.P.A. (Patents) 959, 960, 278 F.2d 510, 512 (1960). For example, if the junior applicant alleges a reduction date after and conception date before the senior applicant's filing date, and the senior applicant does not allege possession of evidence as to conception or reduction to practice dates, the only issue to be resolved is whether the junior applicant can establish that he had been diligently and continuously seeking to reduce the invention to practice from

the parties do not take turns, alternately introducing their evidence on each stage. Instead, the junior applicant opens with his testimony in chief, the senior applicant then puts in his testimony, and finally the junior applicant closes the hearing with his rebuttal testimony.¹² For purposes of analysis, however, it is highly useful to consider the interference in terms of the constantly shifting burden to come forward with evidence.

Reduction to practice, conception. If the parties rest their cases on their respective filing dates, the proceeding terminates forthwith in favor of the senior applicant (*i.e.*, the one who filed first).¹³ The junior applicant may carry the interference forward, however, if he alleges that he reduced the invention to practice or else that he conceived it prior to his rival's filing date.¹⁴ *Reduction to practice*, a highly technical conception, may be defined in very general terms as building or successfully using the invention.¹⁵ *Conception* of the invention is understood to be something beyond mere appreciation of the desirability of achieving the result which the invention reaches, when it is ultimately reduced to practice; the means of accomplishing the desired result must be determined, and there must be disclosure in such tangible form as to corroborate the fact of conception.¹⁶

The interference: reduction to practice stage. Should the junior applicant establish his reduction to practice prior to the senior applicant's filing date, the burden of introducing further evidence rests on the senior applicant, and if he fails to do so, he loses the interference. But if he establishes that his is the earlier reduction to practice date, he shifts back to his rival the burden of introducing further evidence, at this point on conception, and he remains the prevailing party at the close of the reduction to practice stage of the proceedings. On the other hand, if his is the later reduction to practice

a time prior to the senior applicant's filing date. If he can prove this, then according to U.S. Pat. Off. R. 257(a), 37 C.F.R. § 1.257(a) (1960), case (7) of note 18 *infra* will be presumed to obtain, and the junior applicant must prevail; otherwise, the senior applicant must prevail. See note 23 *infra*.

12. U.S. Pat. Off. R. 251(a), 37 C.F.R. § 1.251(a) (1960). This rule also provides that, when *a* files first, then *b* files, and then *c* files, the order of presentation of evidence will be: *c* opens, *b* opens, *a* puts in entire case, *b* rebuts, *c* rebuts.

13. See U.S. Pat. Off. R. 225, 257(a), 37 C.F.R. §§ 1.225, 1.257(a) (1960).

14. See *Ewing v. Fowler Car Co.*, 244 U.S. 1 (1917).

15. See generally *Corona Cord Tire Co. v. Doven Chem. Corp.*, 276 U.S. 358, 383 (1928) (performance of process; assembly, adjustment, and use of machine; complete manufacture of article of manufacture; complete synthesis of composition of matter); *Sherwin v. Drewson*, 29 App. D.C. 161, 173 (1907) (production of "something of practical use, coupled with a knowledge, preferably by actual trial, that the thing will work"); *Guinot v. Hull*, 40 C.C.P.A. (Patents) 982, 204 F.2d 281 (1953). See also *Automatic Weighing Mach. Co. v. Pneumatic Scales Corp.*, 166 Fed. 288, 297 (1st Cir. 1909) (filing constitutes constructive reduction to practice).

16. See *Downs v. Andrews*, 25 F.2d 218 (D.C. Cir. 1928); *Armstrong v. DeForest Radio Co.*, 280 Fed. 584 (2d Cir. 1922); *Field v. Knowles*, 37 C.C.P.A. (Patents) 1211, 1238, 183 F.2d 593, 611 (1950).

date, the senior applicant must proceed to the conception stage and introduce his evidence on that point or else the interference will terminate in favor of his rival.

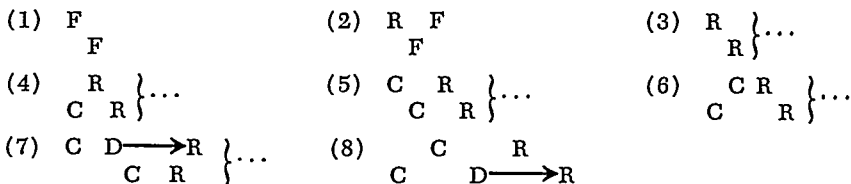
The interference: conception stage. As indicated, the burden of producing evidence on conception rests on the party last to reduce the invention to practice. If his defeat at the reduction stage is followed by another defeat at the conception stage, the interference terminates in favor of his rival, as it would had he rested his case at the end of the reduction stage. But if an earlier conception date is established by the party last to reduce, he can become the prevailing party in the interference if and only if he follows up with a second victory: establishing that he exercised reasonable diligence in attempting to reduce the invention to practice throughout the period from immediately prior to his rival's conception date until his own date of successful reduction to practice.¹⁷ Failing such proof, victory in the interference reverts to the party first to reduce.¹⁸

II. THE AXIOMATIC SYSTEM

The law governing priority can be expressed completely in terms of the relative time sequences of dates of filing, reduction, conception, and diligence. Once the basic interference rules are enunciated in

17. 35 U.S.C. § 102(g) (1958). This time period is often termed the "critical period." See, e.g., *Elmore v. Schmitt*, 47 C.C.P.A. (Patents) 958, 960, 278 F.2d 510, 512 (1960); *Fitzgerald v. Arbib*, 46 C.C.P.A. (Patents) 969, 972, 268 F.2d 763, 766 (1959). Diligence in filing after reduction is not deemed essential, unless the non-diligence is so gross as to constitute abandonment or suppression of the invention. See *ibid.*; *DeForest v. Hartley*, 10 F.2d 901, 903 (D.C. Cir. 1926); *Diamond v. Woodyard*, 38 C.C.P.A. (Patents) 816, 821, 186 F.2d 729, 733 (1951); *Miller v. Hayman*, 18 C.C.P.A. (Patents) 848, 46 F.2d 188 (1931). Diligence before conception is, of course, not meaningful, since "diligence" constitutes perfection of the means conceived and thus presupposes conception of the means to be patented. See *In re Tansel*, 45 C.C.P.A. (Patents) 834, 253 F.2d 241 (1958). The policy of the diligence rule, as will be further developed in the text accompanying notes 42-48 *infra*, is to reward the inventor who works diligently toward reduction to practice while his rival is slothful or attends to his other concerns. The policy rests on the presumption that this rule results in more rapid technological progress.

18. The discussion in the preceding paragraphs is summarized in a commonly used graphical form in the following diagrams, where time sequence runs from left to right, F = filing date, R = reduction date, C = conception date, and $D \rightarrow R$ = a continuous period of diligence ending in successful reduction. The party on the upper line always prevails. The only facts proved in the interference are those specifically indicated, except where elipsis (. . .) is shown for filing dates, in which case that information is immaterial.



terms of these facts, it becomes possible to determine priority between parties for any fact pattern which may be established by the evidence.

Time sequence notation. The semicolon will be used here to indicate the succession of events. Thus "U;V" indicates that the event U happened and then the event V happened. This time relationship can be defined by two axioms:

(A1) IF U;V, THEN U AND V AND NOT V;U. (That is, from "U;V" it follows that U occurred at some time, that V occurred at some time, and that "V;U" is a false statement.)¹⁹

(A2) IF U;V AND V;W, THEN U;W. (That is, if U happened before V, and V before W, then U happened before W. The further convention for using the semicolon will be adopted that the foregoing state of affairs—U;V AND V;W—may be indicated by "U;V;W.")²⁰

Primitive terms and formation rules. The primitive terms of the axiomatic system are the one-place predicates F, R, C (which correspond to the once-occurring events of filing, reduction, and conception) and D (which corresponds to the generally recurring event of exercise of due diligence). Each of these when followed by a variable (lower case letter—a, b, c . . .—standing for person a, person b, person c . . .) indicates an event, e.g., Ca (a conceives the invention), Db (b is exercising due diligence in reducing the invention to practice). The axioms defining well-formed expressions containing these terms follow:

(A3) In any interference involving parties a, b, c . . . n, Ca;Ra;Fa, AND Cb;Rb;Fb, AND Cc;Rc;Fc . . . AND Cn;Rn;Fn. (That is, conception occurs before reduction and reduction occurs before filing.)

(A4) IF Da, THEN Ca;Da;Ra. (That is, diligence by the inventor in reducing the invention to practice occurs only after his conception and before his reduction.)²¹

19. It should be noted that (A1) does not imply "IF NOT (U;V), THEN V;U." That "U happens and then V happens" is false may mean merely that U never happened or that V never happened.

From (A1), it can readily be proved that U;U is never true. Proof: substitute U for each V in (A1). Certain acute problems, however, are posed by recurring events, i.e., successive occurrence of events of the same class. Thus "U;U" is meaningful if understood as "U₁;U₂"—John shaved himself on May 1, 1961, and then again on May 2, 1961. To be sure, if "John shaved himself on May 1, 1961," rather than "John shaved himself" is regarded as the event, then the problem disappears. Unfortunately, however, one of the relevant facts in interference law, viz., diligence, is most feasibly handled as a recurrent event rather than as a unique event. This requires extreme circumspection to avoid paradoxes, or else requires a degree of notational rigor which the writer deems unacceptable in this context.

20. It should be noted that the expression U;V does not imply that there are no other prior, intervening, or subsequent events, e.g., an X, Y, and Z, such that X;U;Y; V;Z. By the same token, only the material facts will be set out in the expressions used here; facts not stated are not necessarily false.

21. See note 17 *supra*. Due diligence from the time U until successful reduction to

(A5) Any expression, and only such an expression, which is otherwise proper (well-formed in propositional calculus) and which is not inconsistent with (A1) to (A4) is permitted in this system.²²

(A6) Rule as to proof: In the absence of proof to the contrary, it will be presumed that there are no events X or Y such that Ca;X;Ra;Y;Fa. (That is, unless evidence is brought forward, the presumption is that conception and reduction immediately precede filing, in that order, and without significant intervening events.)²³

Priority rules. The only remaining primitive term in the system is the two-place relationship, Pab, which means that *a* has a prior claim over *b* to the patent involved in the case. The rules as to relative priority between any two parties *a* and *b* may be summarized as follows:

(R1) IF for every event X, such that Cb;X;Ra, X = Da, THEN Pab.²⁴

practice is indicated: "for every event X, such that U;X;Ra, X = Da." By X = Da—*i.e.*, "Da" may be substituted for "X" in the previous expression (U;X;Ra) and the expression's truth value will be unchanged—it is meant that *a* is diligent at the time of X. Want of due diligence between *U* and reduction would be indicated: "U; nor-Da; Ra," *i.e.*, after *U* and before *Ra* there is a time when nor-Da.

22. Somewhat more precisely, this might be expressed:

(A5) Any expression of the following form (and only such expression) is proper (well-formed) in this system:

(1) One of the predicates *C, R, F, D*, followed by one of the variables *a, b, c . . . n*, or an *X, Y, Z . . .* to represent such an expression, or a *U, V . . .* to represent any event.

(2) Two or more of the foregoing separated by semicolons.

(3) Two or more expressions of form (1) or (2) appropriately joined with logical connectives, *e.g.*, AND, OR, IF . . . THEN, for every . . . such that . . . , . . . (that is, joined in a manner deemed well-formed in propositional calculus).

Any expression inconsistent with (A1), (A2), (A3), or (A4) is false in this system.

23. This is, in essence, the rule of U.S. Pat. Off. R. 257(a), 37 C.F.R. § 1.257(a) (1960). See also *Bates v. Coe*, 98 U.S. 31, 34 (1878). With the assistance of (A6) the paradigms of note 18 *supra* may be restated as follows:

- | | | |
|---------------------|-----------------|-----------------|
| (1) CRF | (2) CR F | (3) CR |
| CRF | CRF | CR } . . . |
| (4) OR } . . . | (5) C R } . . . | (6) C R } . . . |
| C R } | C R } | C R } |
| (7) C D → R } . . . | (8) C R | |
| C R } | C D → R | |

It may be generalized that, except for case (7), IF Ra;Rb, THEN Pab.

24. See note 17 *supra* and accompanying text. If (R1) is satisfied, then it follows that Ca;Cb: Since, if we begin by assuming the premise of (R1), (1) Ca must precede Ra, according to (A3), and (2) Da;Ca is impermissible, under (A4), and (3) if Cb;Ca;Ra, rather than Ca;Cb;Ra, there will be a moment (time being unquantumized) such that Cb; nor-Da; Ca, which is contrary to the requirement of (R1) that no moment of nor-Da interpose between Cb and Ra, it must follow that the sequence of events must be Ca;Cb;Ra, rather than Cb;Ca;Ra. And from this it of course follows that Cb;Ca.

(That is, a has a better claim than b , if a has been continuously diligent throughout the period before his own success in reducing the invention to practice and following b 's conception.)

(R2) IF $Ra;Rb$, and it is not the case that Pba according to (R1), THEN Pab .²⁵

The second rule may be restated more precisely—

IF $Ra;Rb$ AND NOT (for every event X , such that $Ca;X;Rb$, $X = Db$), THEN Pab .

This expression may be further simplified to the following form:

(R2') IF $Ra;Rb$ AND (Ca ; NOT- Db ; Rb), THEN Pab .²⁶

The third rule of priority is that Pab implies that a prevails under (R1) or (R2). More precisely—

(R3) IF Pab , THEN
(for every event X , such that $Cb;X;Ra$, $X = Da$)
OR ($Ra;Rb$ AND [Ca ; NOT- Db ; Rb]).²⁷

Major theorems. The two major theorems of interference law are that between two rival applicants (1) no more than one of them has the prior claim to be designated the inventor, and (2) at least one of them has the prior claim to be the inventor. These may be restated:

(T1) NOT (Pab AND Pba).

(T2) Pab OR Pba .

Each of these theorems may be proved in the axiomatic system which has been developed above, and the proofs are suggested in the margin.²⁸ Taken together, (T) and (T2) establish that a two-party inter-

25. See note 23 *supra*.

26. Ca ; NOT Db ; Rb may be the result of (1) the fact that $Ca;Cb$ (hence NOT- Db after Ca and before Cb under (A4)) or (2) actual non-diligence by b after Ca , even though $Cb;Ca$. From this follows the minor theorem that IF $Ca;Cb$ AND $Ra;Rb$, THEN Pab . See *Erben v. Yardley*, 267 Fed. 345 (D.C. Cir. 1920).

In order to simplify (R2) to (R2') it was necessary to adopt a further convention, (A7) that it will be presumed that for any event X , such that $X;Ra$, $X =$ NOT- Da , unless a , the party in control of this evidence, establishes that his behavior meets the standard of (R1). That is, non-diligence will be presumed unless due diligence is proved by evidence. This is the rule followed by the Patent Office. See *Keizer v. Bradley*, 47 C.C.P.A. (Patents) 709, 270 F.2d 396 (1959); *Hull v. Davenport*, 24 C.C.P.A. (Patents) 1194, 90 F.2d 103 (1937). Thus, (Ca ; NOT- Db ; Rb) in (R2) means that b fails to prove his due diligence throughout the period between Ca and Rb . The conventions (A6) and (A7) could have been avoided by using a modal logic in phrasing all the rules, see VON WRIGHT, AN ESSAY IN MODAL LOGIC 29-35, 42-56 (1951), instead of the conventional logic employed here. Thus, in (R1) and (R3), " $X = Da$ " would be replaced by "it is proved that $X = Da$." But the added complexity does not appear to be justified in the circumstances.

27. (R1), (R2), and (R3), the necessary and sufficient conditions for Pab , can be combined into one general rule by changing the "if" of (R3) to "if and only if" (logical equivalency).

28. Each theorem can be proved by the method of proof by contradiction. That is, the contrary of what is to be proved is assumed, and this is then shown to entail a contradiction. It follows that the initial assumption must be incorrect.

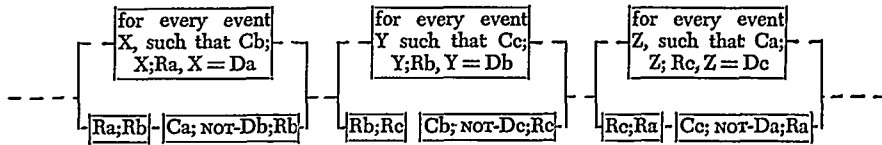
To prove (T1), assume the truth of " Pab AND Pba ." Use of (R3) leads to a number of alternative propositions each one of which is self contradictory. *E.g.*, party a

ference proceeding will establish which of two rival claimants is the true inventor entitled to the patent. Of course, if this could not be shown then there would be no justification for the existence of the axiomatic system; that these theorems can be proved furnishes the reason for the existence of interference law.²⁹

III. THE THREE-PARTY INTERFERENCE PARADOX

Thus far the general principles of interference law have been developed without discerning any paradoxes. The two-party interference has been shown to be completely determinate in terms of the facts C, D, R, F.³⁰ The next reasonable question is whether the same holds true for the three-party interference.

One might well assume, from (A3) which states that temporal succession goes one way, that—IF (Pab AND Pbc), THEN Pac (that is, NOT [Pab AND Pbc AND Pca]). This hypothesis can be tested by the method of proof by contradiction: we look for a contradiction to follow from assuming that—Pab AND Pbc AND Pca. If a self-contradictory proposition follows, then the hypothesis is correct since its denial is false. By (R3), a conjunction of three sets of propositions follows from Pab AND Pbc AND Pca: first, (R3) as set out above at page 137; second, that expression with “Pbc” substituted for “Pab” (and therefore *b* for *a*, and *c* for *b*); and third, that expression with “Pca” substituted in. This complicated expression can be represented diagrammatically by showing the *and*'s as series paths and the *or*'s as parallel paths:³¹



Certain paths, such as the lowest series path, via Ra;Rb . . . Rb;Rc . . . Rc;Ra, represent propositions that are obvious contradictions.

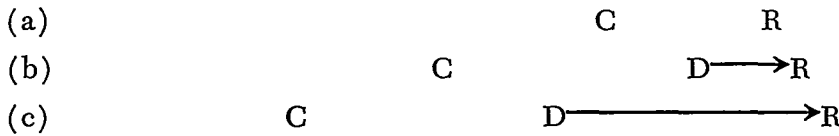
is both diligent and non-diligent at the same time. The second theorem may be proved similarly by assuming the truth of “NOT (Pab OR Pba),” *i.e.*, “NOT-Pab AND NOT Pba.” This entails a complicated string of contradictions.

29. See text accompanying note 1 *supra*.

30. It should be noted that by (A6) F is relegated to a minor role here, as it is in actual practice except to the extent that it allocates the initial burden of proof. This is by no means an unimportant factor, however, in interference practice. There is a well-known saying, “I would rather be the senior party than the first inventor.” 1961-62 MANAGEMENT SURVEY OF THE U.S. PAT. OFF. 58 (Sen. Pat., T.M., Copr. Subcomm. Print 1962).

31. See Allen, *Toward a Procedure for Detecting and Controlling Syntactic Ambiguity in Legal Discourse*, in 3 ADVANCES IN DOCUMENTATION AND LIBRARY SCIENCE 955 (Kent ed. 1961). The series paths represent AND, while the parallel paths represent OR.

Other paths, however, may be traversed without contradiction, *e.g.*, the lower branches of the first two loops and the upper branch of the third, which involves (1) Ra;Rb;Rc, (2) Ca; not-Db; Rb, (3) Cb; not-Dc; Rc, (4) Dc for at least the interval from Ca to Rc. This may be shown graphically as follows:

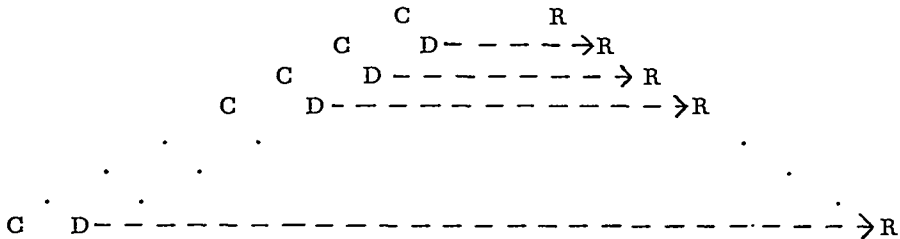


Pab because (1) Ra;Rb and (2) *b* does not rebut this by proving prior conception *plus* diligence before Ca.³² Pbc for the same reason; *c*'s diligence is insufficient to prevail over *b*. The diligence of *c* is sufficient, however, for Pca.³³ The proof by contradiction fails.

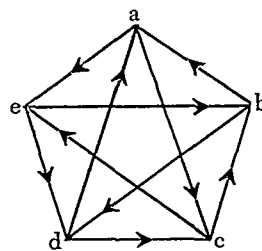
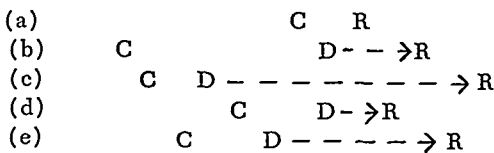
There is, then, a three-party interference paradox.³⁴ It is possible

32. The result is the same if *b* is never diligent. What is critical for the circuity of priorities is that *b* not commence due diligence before Ca, and that *c* commence diligence between Cb and Ca.

33. It is obvious from the diagram that there is at least one n-party interference paradox:



This is, of course, not the only pattern for a higher-order paradox. The following arrangement of reduction and conception dates gives rise to a more intricately patterned five-party paradox most readily characterized by a pentacle inscribed in a pentagon, where the direction of priorities in the circumscribing pentagon runs counter to the priority order of the inscribed pentacle:



Priorities follow direction of arrows.

34. The author has found no reported decision indicating that this paradox has been the subject of litigation. The paradox is recognized, however, in Ferrill, *An Anomalous Situation in the Law of Interference as Applied in Multi-Party Cases*, 33 J. PAT. OFF. Soc'y 457 (1951).

for *a* to have a better claim than *b*, *b* have a better claim than *c*, and *c* have a better claim than *a*. Or, to put it more boldly, *a* may have invented the object prior to *b*, *b* prior to *c*, and *c* prior to *a*. Analysis of the diagram leads to no further distinct paradoxes.³⁵ The presence of one such paradox, however, should be sufficient to warrant re-examination of the statutory priority rules. To be sure, other remedies short of modification of the priority rules may be adopted to eliminate the paradox. The patent could be awarded to *a*, *b*, and *c*, as joint proprietors, as is done with joint inventors who have cooperated in developing an invention.³⁶ Or the patent could be granted to none of them, and cast into the public domain.³⁷ But neither of these solutions appears desirable. Some one of the parties should be the true "original and first inventor"³⁸ to whom the exclusive right to the discovery belongs, and our interference law should be adequate to determine this.³⁹

35. It should be noted that whether Cb;Cc or Cc;Cb in the diagram, the result is the same. Ferrill, *supra* note 34, uses what amounts to Cb;Cc. In the former case, with whatever significance that may have, *c* is no longer the "first to conceive" of *a*, *b*, and *c*. Query: Does this deny *c* the power to invoke 35 U.S.C. § 102(g) (1958) against *a*? The author believes that "first" and "last" as used in § 102(g) are intended to mean "earlier" and "later," preserving the two-party relationship suggested by the last words of the section, "the other."

36. 35 U.S.C. § 116 (1958).

37. *Cf.* Dutcher v. Matthew, [1905] Dec. Com. Pat. 455, holding with respect to the allocation of burden to file preliminary statement that "junior party" means any party not the first, even though not the last. By analogy, the priority rules could be understood to eliminate those with poorer claims, rather than to choose the party with the best claim, *cf.* Christie v. Seybold, 55 Fed. 69, 78 (6th Cir. 1893), and if all were eliminated by the rules, none would have proved himself fit to warrant his receiving the grant. This is, it is believed, a fairly drastic approach. See also Comments, 33 J. PAT. OFF. SOC'Y 695 (1951).

38. Sec 35 U.S.C. § 115 (1958).

39. See text accompanying note 3 *supra*. See also Radio Corp. of America v. Radio Engineering Labs., Inc., 293 U.S. 1, 3 (1934).

One way to resolve the paradox, and at the same time purport to use the existing statute as it stands, would be to break the circuitry chain arbitrarily by eliminating one of the parties, and then apply the customary two-party rule between the survivors. This is the technique frequently used by the courts in lien circuitry problems. See, *e.g.*, *In re Einhorn Bros., Inc.*, 272 F.2d 434 (3d Cir. 1959); *In re Quaker City Uniform Co.*, 238 F.2d 155 (3d Cir. 1956); *Miller's Appeal*, 122 Pa. 95, 15 Atl. 672 (1888); *Wilcocks v. Waln*, 10 S. & R. 380 (Pa. 1824). For example, the second claimant, *b*, might well appear to be eliminated under any theory, because he is intermediate in conception time, reduction time, and time of commencement of diligence; whatever policy is at stake would not seem to warrant favoring him above all others. And once *b* is eliminated, *c* prevails over *a* under the standard rule.

This solution has little to recommend it, however, except that it is a solution. Without determining specifically what the policy of the interference rule is, it is hardly reasonable to assume that *b* is necessarily to be disfavored, despite his intermediate time status as to each of the relevant factors taken singly. The proposed solution ignores one of the relevant priorities—that of *b* over *c* because of prior reduction not rebutted by due diligence—and thus, is able to reach the result. One could with equal justice, or at least so it would appear, throw *a* out because he is last on two out of three factors (conception and diligence). The interference between *b* and *c* would then have to be resolved in favor of *b*.

Moreover, further *ad hoc* refinements are necessary in the n-party interference as

If modification of the priority rules is feasible, that would appear to be the preferred solution. The proposal which follows, it is believed, represents such minimal tinkering with the priority rules as will eliminate the paradox without doing violence to the policy of the statute.

IV. THE PROPOSED MODIFICATION

Many ways to avoid the three-party paradox can be devised. A pure race of diligence in filing or in reducing to practice could be substituted.⁴⁰ Or earliest date of conception could be made determinative. Although they each have the advantage of simplicity, these alternatives would do violence to the policy of the interference law, and they are therefore unlikely to command acceptance.

Section 102(g) of the present Patent Act⁴¹ stems originally from the Patent Act of 1836.⁴² While the present provision directs the Patent Office to consider, in awarding patent grants, the "reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other," the prototype, section 15 of the 1836 statute, made it a defense to an infringement suit that the patentee had "unjustly obtained the patent for that which was in fact invented or discovered by another, who was using reasonable diligence in adapting and perfecting the same."⁴³ The reason for the enactment of section 15 is uncertain.⁴⁴ Mr. Justice Story found it somewhat puzzling that the race of diligence was not to be given full sway, but he rationalized the provision in terms of the general equitable doctrine that he who is first in time is first in right, in the absence of intervening rights.⁴⁵ The policy of the diligence doctrine, as it has now crystallized, is that inventors should be encouraged (or coerced) to reduce their conceptions to practice, in order that the public may secure their benefit and that the progress of the useful arts be furthered.⁴⁶ At the same time, it is deemed un-

n exceeds three. Unfortunately, the more complex solutions proposed in lien circuitry cases (see generally Gilmore, *Circular Priority Systems*, 71 YALE L.J. 53, 58-63 (1961)) do not lend themselves to the present case for want of a fund to distribute. *But see* text accompanying note 36 *supra*.

40. See *Reed v. Cutter*, 20 Fed. Cas. 435, 438 (No. 11645) (C.C.D. Mass. 1841); *Woodcock v. Parker*, 30 Fed. Cas. 491 (No. 17971) (C.C.D. Mass. 1813). The 1961-62 MANAGEMENT SURVEY OF THE U.S. PAT. OFF. 59 (Sen. Pat., T.M., Copr. Subcomm. Print 1962) suggests that the basis for patent award should be changed to the reduction date, apparently for reasons of administrative convenience.

41. 35 U.S.C. § 102(g) (1958).

42. 5 Stat. 123, § 15.

43. This defense is now subsumed under the more general defense of invalidity. See 35 U.S.C. § 282 (1958) (Reviser's Note). See also 35 U.S.C. § 102(f) (1958).

44. The legislative history gives little indication of Congress' intent. See S. Doc. No. 338, 24th Cong., 1st Sess. (Comm. Rep. on S. 239, 1836).

45. See *Reed v. Cutter*, 20 Fed. Cas. 435, 438 (No. 11645) (C.C.D. Mass. 1841).

46. See *Watson v. Allen*, 254 F.2d 342, 346 (D.C. Cir. 1958); *Derr v. Gleason*,

fair to the diligent, painstaking inventor⁴⁷ to allow the fruits of victory to be snatched from him by the rival who was earlier to conceive, but who has slumbered on his rights until stirred into activity by a rival's success.⁴⁸

These policies are preserved and the paradox is eliminated by a rule which relaxes the requirement that diligence precede the rival's conception date to a requirement that diligence merely precede the commencement of the rival's diligence. The rationale of the present rule of making the rival *b*'s conception date (*Cb*) the beginning of the critical period during which *a*, the claimant earlier to conceive, must be diligent is that (1) prior to *Cb*, *b* has no standing to complain about *a*'s activities, prejudicing him, and (2) after *Cb*, *b*'s rights have begun to accrue and *a* ought to be diligent if he would retain his priority. But *b*'s rights may just as well be deemed to accrue only when his diligence commences.⁴⁹ Indeed, there is no reason to hold *a* to diligence and to allow *b* to indulge in the languors forbidden his rival.⁵⁰ The policy of the diligence rule (*viz.*, encouraging inventors to reduce their conceptions to practice promptly) would appear as applicable to *b* as to *a*.

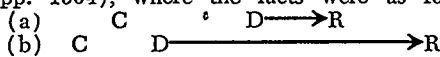
Accordingly, the following amendment is proposed to section 102

258 Fed. 969, 972 (D.C. Cir. 1919); *cf.* Hubbard v. Berg, 40 App. D.C. 577, 582 (Ct. App. 1913); Christie v. Seybold, 55 Fed. 69, 77 (6th Cir. 1893).

47. It should be noted, however, that the diligence (or non-diligence) rule protects diligent and non-diligent alike against non-diligent rivals. Thus, in the figure in text preceding note 32 *supra*, *b* prevails over *c*, where both lack diligence and, indeed, *b* is even less diligent than *c*. This corresponds to the facts in Grabowsky v. Gallaher, 39 App. D.C. 548, 551-53 (Ct. App. 1913); Paul v. Johnson, 23 App. D.C. 187 (Ct. App. 1904).

48. See UNDERWOOD, INTERFERENCE PRACTICE 63 (1920): "There can be no reason for depriving the later, diligent, industrious inventor of a reward in the form of a patent, merely to accommodate the doleless, idle inventor who has no excuse for holding back his invention." See also cases cited in note 46 *supra*. Another category of rival against which the diligence rule protects the inventor first to conceive is the later-conceiving, perhaps overly brilliant inventor whose flash of genius outpaces the sheer plod of his reasonably diligent rival. This is, in effect, the policy Justice Story referred to in Reed v. Cutter, 20 Fed. Cas. 435 (No. 11645) (C.C.D. Mass. 1841), and is exemplified by the relationship of *c* and *a* in the diagram.

49. This appears to be the position unsuccessfully urged in Grabowsky v. Gallaher, 39 App. D.C. 548, 551-53 (Ct. App. 1913); Paul v. Johnson, 23 App. D.C. 187 (Ct. App. 1904), where the facts were as follows:



In both cases *a* prevailed despite the superior diligence of *b* and his own want of diligence. Although these decisions reflect a proper reading of the statute, the policy served by the result is not apparent, since the policy of the diligence rule, see note 48 *supra*, negatives the possibility that the law would merely award the race to the swift (in reducing).

50. See Hubbard v. Berg, 40 App. D.C. 577, 582 (Ct. App. 1913). Compare the diligence of *b* with that of *c* in the diagram in text preceding note 32 *supra*.

(g):⁵¹ strike "conception" and substitute "the commencement of like diligence," and then strike "first to conceive and,"⁵² making the revised section read: "there shall be considered . . . the reasonable diligence of one who was last to reduce to practice, from a time prior to the commencement of like diligence by the other."⁵³ Perhaps it would be as well to add a further particularization of the present diligence rule at the close of the section: "'Diligence' shall be deemed to be restricted to continuous effort which successfully terminates in reduction to practice."⁵⁴

Restatement of the priority rules. This statutory amendment would alter (R1) from the form as given before to:

(RIA) IF there is an event U, such that:

(1) U; NOT-Db; Rb,

AND

(2) for every event X, such that U;X;Ra, X = Da, THEN Pab.

51. The present language of § 102(g) is set out here in roman type, the proposed deletions are surrounded by brackets ([]), and the proposed additions are set out in italics:

° ° ° In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was [first to couceive and] last to reduce to practice, from a time prior to [conception] *the commencement of like diligence* by the other. 35 U.S.C. § 102(g) (1958).

52. It was necessary to strike the "first to conceive" qualification to avoid substitution of a new paradox for the old. Thus, if Ca;Cb is left in as a further requirement under the rule, see (RIA) in the text following note 54 *infra*, the following three-party paradox may occur:

(a) C D → R
 (b) C D → R
 (c) C D → R

Here, Pab, despite the greater diligence of *b*, because *b* may not invoke the diligence rule since Ca;Cb. Pbc because Rb;Rc, unrebutted by proof of *c*'s superior diligence. Finally, Pca under the new diligence rule.

It should be noted that this deletion eliminates the minor theorem referred to in note 26 *supra* (first to conceive, first to reduce).

53. For the reasons previously given in text, there would appear no valid basis for focusing attention on the conception date in itself. Reduction to practice, rather than conception, is "invention" under our law. See *Clark Thread Co. v. Willimantic Linen Co.*, 140 U.S. 481, 489 (1891); *Consolidated Vultee Aircraft Corp. v. Maurice A. Garbell, Inc.*, 204 F.2d 946, 949 (9th Cir. 1953). Attention is paid to conception only for the purposes of the diligence rule, and the use of the restriction "first to conceive" in § 102(g) has been warranted only because the old diligence rule requires commencement of diligence before the rival conceives, therefore making the rule unavailable to the party last to couceive. (And even there, the use of the restriction is redundant.) Adoption of a pure diligence rule, however, makes recourse to conception dates relevant only for delimiting the earliest possible diligence date. Thus C, as already proved to be the case with respect to F, is relegated to a minor role in determining priority of invention.

54. Change of "last" to reduce to "later" would also be more in keeping with practice than the existing language. And elimination of "conception and" in the phrase "respective dates of conception and reduction to practice of the invention" would appear appropriate in view of the relative unimportance of that date. See note 53 *supra*.

That is, *a* prevails under the new diligence rule if there is a point in time at which his reasonable diligence has begun but *b*'s has not yet begun. Such diligence, of course, must proceed continuously to reduction to practice.

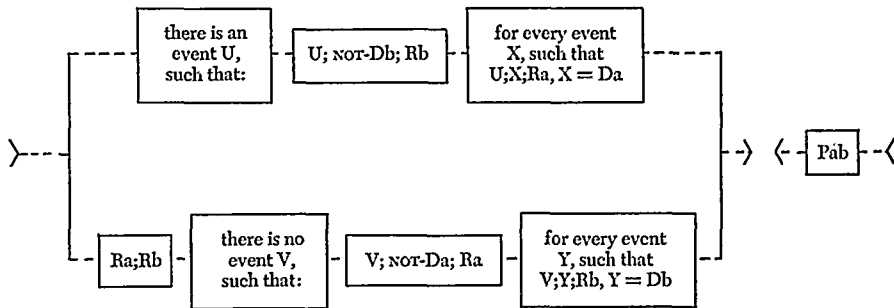
This revision of (R1) necessitates corresponding revision of (R2'). Thus (R2') becomes:

- (R2A) IF $Ra;Rb$, AND
 there is no event U , such that:
 (1) $U; NOT-Da; Ra$
 AND
 (2) for every event X , such that $U;X;Rb, X = Db$, THEN
 Pab .

By the same token, (R3) must be restated—

- (R3A) IF Pab ,
 THEN
 (A) there is an event U , such that:
 (1) $U; NOT-Db; Rb$, AND (2) for any event X , such that $U;X;Ra, X = Da$,
 OR
 (B) $Ra;Rb$ AND there is no event V , such that:
 (1) $V; NOT-Da; Ra$, AND (2) for any event Y , such that $V;Y;Rb, Y = Db$.

These three expressions, the necessary and sufficient conditions for Pab , may be combined diagrammatically as follows:⁵⁵



Major theorems. For the modified system to be acceptable—i.e., for it to be adequate to determine priority of invention—three theorems must be provable:

- (T1A) NOT (Pab AND Pba)
 (T2A) Pab OR Pba
 (T3A) NOT (Pab AND Pbc AND Pca)

⁵⁵ See note 27 *supra*. The facing arrows indicate "if and only if," or necessary and sufficient conditions (logical equivalency). Each $\rightarrow \dots \rightarrow$ indicates "if . . . , then" See note 31 *supra*.

Each of them is readily provable by the method of proof by contradiction used previously.

Moreover, from these theorems a proof by induction can be developed that there is no n -party paradox in which a circuitry of priorities exists—of the form $Pab, Pbc, Pcd . . . Pinn, Pna$. Instead, in the modified system, it is necessary that any set of rival claimants may be arrayed in a linear priority order. This is, to be sure, no guarantee that other interference law paradoxes may not arise.⁵⁶ But this danger was just as likely under the unmodified system. It would appear, then, that there would be nothing to lose, and the elimination of a paradox to gain, by adoption of the proposed amendment.

Whether adoption of this amendment in the near future is likely is quite a different matter. The area certainly is obscure and the general interest in its logical symmetry (outside the patent bar) limited. Short of a rash of embarrassing cases in the courts, it is difficult to imagine successful pressure for amendment before the next recodification of the Patent Act.⁵⁷

56. Even where the life of the law is logic we still have Goedel's Theorem to contend with. According to this theorem, in any logical system of the degree of complexity of that used here (where there are logical quantifiers), only inconsistency can be proved and consistency can only be hoped for. See 2 HILBERT & BERNAYS, *GRUNDLAGEN DER MATHEMATIK* 306-24 (1934) (consistency proof requires resort to higher-order system).

57. 35 U.S.C. §§ 1-293 (1958). The act was last recodified in 1952. See 66 Stat. 792.

