

United States Court of Appeals for the Federal Circuit

01-1646

(Interference nos. 103,525 and 103,526)

IN RE SCOTT T. JOLLEY

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Appealed from: United States Patent and Trademark Office
Board of Patent Appeals and interferences

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IN RE SCOTT T. JOLLEY

DECIDED: October 29, 2002

Before MICHEL, CLEVINGER, and BRYSON, Circuit Judges.

CLEVINGER, Circuit Judge.

Scott T. Jolley appeals the decision of the Patent and Trademark Office Board of Patent Appeals and Interferences granting priority of invention to Phillip W. McGraw, Eldon L. Ward, and Michael W. Edens ("McGraw") on the basis of an earlier conception and diligence toward a later reduction to practice in combined Interferences 103,525 and 103,526. We find the Board's factual determinations supported by substantial evidence and its legal conclusions sound, and we consequently affirm the Board's award of priority to McGraw.

BACKGROUND

This interference arises ultimately from the realization that refrigerants containing chlorine (chlorofluorocarbon ("CFC") refrigerants, often known as Freons) destroy atmospheric ozone when ultraviolet radiation in the upper atmosphere breaks off chlorine from the CFC molecule. This discovery, and the 1987 Montreal Protocol restricting the use and production of widely used CFC refrigerants such as R12 and

R22, prompted a search for chlorine-free refrigerants that had thermodynamic properties comparable to those of CFCs but would not pose a threat to the Earth's protective ozone layer. The compound R134a ($\text{CF}_3\text{CH}_2\text{F}$) was quickly identified as the only feasible "drop-in" replacement for the commonly used CFC R12, due to its similar thermodynamic properties, chemical stability, and low toxicity. R134a is known as a hydrofluorocarbon, or HFC, because it contains fluorine but no chlorine.

The switch from CFC to HFC refrigerants, however, also required another technological advance: the development of new lubricants for HFC-based cooling systems. Mechanical pumps circulate the refrigerant in most refrigeration systems, and such pumps require lubrication. Refrigeration systems usually employ a lubricant mixed in with the circulating refrigerant, and such an arrangement poses special challenges for lubricants. Reliable lubrication is essential in a closed system that must run for long periods of time without maintenance. Furthermore, because the refrigerant cycles between hot and cold temperatures during operation, an effective lubricant must be soluble in the refrigerant throughout the range of operating temperatures, i.e. the two components should exist as a single liquid or gaseous phase, without separating, at all operating temperatures. Conventional lubricants (such as mineral oils) were known to be poorly soluble in R134a at the required operating temperatures, and several companies during the late 1980s sought to develop a lubricant composition that would be compatible with R134a. Among these companies were the Lubrizol Corporation, assignee of appellant Jolley, and the Dow Chemical Company, assignee of absent interference party McGraw.

Proximately, this appeal arrives by way of a five-way interference proceeding held to determine priority of invention for a particular ester lubricant composition compatible with chlorine-free HFC refrigerants. Only two parties are pertinent here: senior party Jolley, who was accorded the benefit of his application 07/608,600, filed April 25, 1989, and junior party McGraw, who was accorded the benefit of the application that matured into issued U.S. Patent 4,959,169, filed October 20, 1989. The consolidated interference count was defined in the alternative by reference to various claims of the applications or patents of the five involved parties. All of the relevant claims correspond to the single interference count, and claim 1 of Jolley's application illustrates the subject matter to which the evidence of priority has been directed:

1. A liquid composition comprising:

(A) at least one fluorine-containing hydrocarbon containing 1 or 2 carbon atoms,

further wherein fluorine is the only halogen in said fluorine-containing hydrocarbon;

and

(B) an effective amount of at least one soluble organic lubricant comprising at least one carboxylic ester of a carboxylic acid and a polyhydroxy compound characterized by the general formula



wherein R is a hydrocarbyl group, each R¹ is independently hydrogen, a straight chain lower hydrocarbyl group, or a branched chain hydrocarbyl group, and n is at least 2.

Component (A) in this incarnation of the count defines an HFC refrigerant such as R134a. Component (B) (the lubricant) is an ester, which is an organic compound typically formed by reacting alcohols and carboxylic acids. The esters of component (B)

are esters of polyhydric alcohols, which is to say that multiple carboxylic acid moieties are attached to a single organic backbone. For example, esters of pentaerythritol, a tetrahydroxy alcohol, are polyhydric ester alcohols. Jolley's specification further defines the carboxylic acid portion of the ester (the "hydrocarbyl group" of R¹) as being up to seven carbon atoms in length.

Jolley established conception of this invention no earlier than June 2, 1988. The Board, however, awarded priority to McGraw, based on an alleged May 20, 1988, prior conception, coupled with diligence extending to a reduction to practice in September or October of 1988. The Board further found that Jolley's claims were unpatentable as anticipated by an earlier patent disclosing ester lubricants for CFC refrigerants, U.S. Patent No. 2,807,155 to Williamitis, and in light of this determination did not reach the further question of whether Jolley's claims were obvious in light of the prior art.

Jolley is the only party appealing the Board's decision. Jolley contests the Board's (1) conclusion that McGraw's evidence suffices to show conception of the subject matter of the count, (2) its determination that McGraw's inventive activity during the critical time period should be credited toward reduction to practice of the invention as conceived, and (3) its determination that the Williamitis patent provides a complete and enabling disclosure of subject matter encompassed by Jolley's claims. McGraw, whose issued '169 patent was awarded priority in the interference, did not respond to Jolley's opening brief, nor did any of the other junior parties in the interference.¹ We subsequently granted the motion of the Director to participate in the appeal to defend the Board's decision, and to recaption the appeal In re Jolley.

¹ Two of the junior parties settled with Jolley prior to Jolley's appeal.

Whether a party to an interference has demonstrated conception of the invention of the count is a legal conclusion, based on subsidiary factual findings. Cooper v. Goldfarb, 154 F.3d 1321, 1327, 47 USPQ2d 1896, 1901 (Fed. Cir. 1998). We review the Board's legal conclusions without deference, but we must affirm its factual findings if they are supported by substantial evidence. Hitzeman v. Rutter, 243 F.3d 1345, 1353, 58 USPQ2d 1161, 1166-67 (Fed. Cir. 2001). Substantial evidence "means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." Consol. Edison Co. v. NLRB, 305 U.S. 197, 229 (1938). Our review of factual findings for substantial evidence examines the record as a whole, taking into account evidence that supports the Board's position as well as that evidence detracting from the Board's conclusion. In re Gartside, 203 F.3d 1305, 1312, 53 USPQ2d 1769, 1773 (Fed. Cir. 2000). Significant to resolution of the instant case, "the possibility of drawing two inconsistent conclusions from the evidence" will not render the Board's findings unsupported by substantial evidence. See Consolo v. Fed. Mar. Comm'n, 383 U.S. 607, 620 (1966). If the evidence in record will support several reasonable but contradictory conclusions, we will not find the Board's decision unsupported by substantial evidence simply because the Board chose one conclusion over another plausible alternative.

The count is directed to a "two-component" composition: an HFC refrigerant and an ester lubricant. McGraw's initial conception was not of a pure ester lubricant as defined by the count, but rather a lubricant mixture including both an ester and a separate polyhydric alcohol component. Because the count is "open," i.e., its

"comprising" language permits additional ingredients (such as a polyhydric alcohol lubricant) to be present in the composition defined by the count's limitations, the Board concluded that McGraw could claim the benefit of its documented conception of and diligence toward a "three-component" system: a refrigerant, an ester, and a polyhydric alcohol (also called a polyol or polyglycol). This work also led to noninvolved patent 4,851,144, a narrower patent which explicitly claims ester/polyol lubricant blends.

Before the Board, Jolley had argued that McGraw's conception of a separately patentable invention could not also establish conception of the subject matter of the interference count. However, on appeal, Jolley relies more heavily on the argument that McGraw's evidence was on its face too generalized to serve as a conception of the subject matter of the count. As McGraw's conception was not limited to the esters of the count, but rather encompassed esters both inside and outside the count limitations, Jolley contends that this disclosure as a matter of law cannot support conception of the subject matter of the interference count.

Both the elements of conception and the nature of the disclosure required to prove it were set forth by one of our predecessor courts in Townsend v. Smith, 36 F.2d 292, 4 USPQ 269 (CCPA 1929):

It is therefore the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is thereafter to be applied in practice that constitutes an available conception within the meaning of the patent law. A priority of conception is established when the invention is made sufficiently plain to enable those skilled in the art to understand it.

Id. at 295, 4 USPQ at 271. Because conception is a mental act, "it must be proven by

evidence showing what the inventor has disclosed to others and what that disclosure means to one of ordinary skill in the art." Spero v. Ringold, 377 F.2d 652, 660, 153 USPQ 726, 732 (CCPA 1967).

The Board in this case found that such a disclosure could be found in an e-mail sent by Ward to co-inventor McGraw and several other Dow employees on May 20, 1988. This e-mail stated:

I suggest that we thoroughly evaluate the possibility of blends of polyglycols with esters as lubricants for refrigerants such as R-134A, even if we discover some specific polyglycol or polyglycol derivatives that work well. If we can show that polyglycol/ester blends exhibit some improvement over a pure polyglycol basestock, we could end up with defacto patent coverage on the basis of our two compressor lubricant patents, which, as you know, each have composition of matter claims separate from the use claims as compressor lubricants.

Due to the present research activities of companies like Union Carbide, ICI, Allied, and DuPont, "generic" patent disclosures on the use of polyglycols for this application have probably already been filed. If polyglycol/ester blends really work better in this application, we could really pull off a coup de grace.

It is undisputed that "our two compressor lubricant patents" referred to two patents assigned to Dow, U.S. Patent No. 4,302,343 to Carswell and McGraw ("Carswell '343") and U.S. Patent No. 4,751,012 to Ward, McGraw, and Appleman ("Ward '012"). Both Carswell '343 and Ward '012 disclose and claim polyglycol/ester blends as lubricants for air compressors. Although the esters disclosed by Ward '012 are not within the scope of the count, some (but not all) of the Carswell '343 ester lubricants fall within the scope of the count. Carswell '343 discloses esters formed from polyols and straight-chain saturated carboxylic acids ("alkanoic acids") having 4 to 18 carbon atoms; those esters with an alkanoic acid portion having 4 to 8 carbon atoms lie

within the count. Carswell '343 also names eight specific examples of lubricant esters; of these esters, five are within the scope of the count.

Although Jolley criticizes the Board's reliance on testimony from the inventors and other Dow employees, who expand upon the disclosure of the May 20 e-mail by describing their understanding that Ward's communication encompassed particular pentaerythritol esters within the scope of the count, Jolley does not seriously dispute the Board's determination that Ward's reference to "esters" in this disclosure meant the esters disclosed by the Carswell '343 and Ward '012 patents. Thus, the problem posed by this case is straightforward in concept if not in resolution. Ward's e-mail evidences a conception including esters both within and without the count. Conversely, the count encompasses some esters that were the subject of Ward's e-mail as well as others that were not. The disclosure of conception and the scope of the count have some overlap, but do not correspond neatly with each other.

In their briefs, the parties stake out extreme positions as to how this dilemma of an overlapping conception should be resolved. The Director, apparently relying on the principle that "one may establish priority for a generic claim on the basis of a showing that he was prior as to a single species," In re Taub, 348 F.2d 556, 562, 146 USPQ 384, 389 (CCPA 1965), argues that McGraw should be credited with conception of the genus so long as McGraw can prove conception of any species falling within the scope of the count.² However, the Director admits that if Ward's e-mail were sufficiently

² Although Jolley does not contest the Director's statement of the rule, neither this court nor its predecessor has held that the first to conceive of a species is the first to conceive of the generic invention. While the Board has so held, see Miller v. Walker, 214 USPQ 845, 847 (Bd. of Patent Interferences 1982), we have held only that "conception of a species within a genus may constitute conception of the genus."

generalized—such as proposing the use of "esters" without reference to the set of esters disclosed by Dow's patents—then it could not support conception of the invention of the count, despite the fact that the bare term "esters" would encompass the subject matter of the count. The Director therefore concedes that conception is not necessarily established merely upon a showing of any degree of overlap between the disclosure and the subject matter of the count. For his part, Jolley invokes the maxim that "every limitation of the count must have been known to the inventor at the time of the alleged conception," Coleman v. Dines, 754 F.2d 353, 359, 224 USPQ 857, 862 (Fed. Cir. 1985) (citations omitted), and contends that Ward's inclusion of esters outside the scope of the count demonstrates that Ward did not know all the count's limitations when he composed his May 20 e-mail. But Jolley admits that if Ward had proposed in his e-mail a small number of compounds, such as two esters, one inside and one outside the count, then McGraw would have established conception of the subject matter of the count—despite the inclusion of subject matter beyond the scope of the count. Thus, neither party's extreme legal theory provides a general solution to the problem presented when a documented conception partially overlaps the subject matter of an interference count.

However, the question of whether a generalized disclosure corresponds with sufficient particularity to the chemical genus defined by an interference count is hardly a question of first impression. The basic framework for resolving this question was laid

Oka v. Youssefyeh, 849 F.2d 581, 584, 7 USPQ2d 1169, 1171 (Fed. Cir. 1988) (emphasis added). However, since Jolley agrees with the Director's formulation, we deem Jolley to have conceded conception in the event that McGraw's e-mail disclosed with sufficient particularity the Carswell esters falling within the scope of the count.

down nearly half a century ago by one of our predecessor courts in Prutton v. Fuller, 230 F.2d 459, 109 USPQ 59 (CCPA 1956):

The question as to whether an application forms a proper support for a claim to a composition which is not specifically disclosed, but which falls among compositions suggested by general language in the application is one which must be determined largely by the particular circumstances of each case. The determining factor is whether the application would fairly suggest to the skilled worker in the art the particular composition claimed, or whether the desirability of that composition could be ascertained only by extensive experimentation. . . . [T]he indication or lack of indication of a preference for the composition, in the application disclosure, is an important factor to be considered in making the determination, since anyone attempting to carry out the disclosure of an application would logically begin with the preferred examples given.

Id. at 463, 109 USPQ at 61. Although Prutton dealt with the question of whether a patent application, rather than a documented conception, provided adequate support for the compositions of the count, the Court of Customs and Patent Appeals later made clear in Spero v. Ringold that "the standard for proving conception is not essentially different from that required for proving reduction to practice or adequacy of support in a disclosure for a claim." 377 F.2d at 660, 153 USPQ at 732.

Thus, when disclosure and count overlap, the question of whether an alleged conception discloses the subject matter of an interference count with sufficient particularity is a fact-intensive inquiry, based on whether the evidence of conception fairly suggests to one of ordinary skill the subject matter of the count, without the need for extensive experimentation to ascertain whether the matter encompassed by the disclosure suggests the desirable features of compositions belonging to the count. Although the fundamental inquiry in conception is whether the inventor held the

complete invention in his or her own mind, proof of conception requires objective evidence of what the inventor has disclosed to others, and what that disclosure would fairly suggest to one of ordinary skill in the art. Id. Thus, a preference for particular subject matter, highly relevant though not dispositive to this inquiry, must also be established on the basis of objective evidence.

At the outset, Jolley contends that because Ward's e-mail sets forth nothing more than a "research proposal" suggesting that a group of compounds be tested for the desired activity, it cannot evidence a complete, definite, and settled idea as the law of conception demands. Although we have stated that when the inventor has no more than "a general goal or research plan he hopes to pursue" conception has not occurred, Burroughs Wellcome Co. v. Barr Labs., Inc., 40 F.3d 1223, 1228, 32 USPQ2d 1915, 1919 (Fed. Cir. 1994), the conception inquiry is fact-intensive and no per se rule excludes "research proposals" as evidence of conception. Jolley's contention is answered in the negative by Lazo v. Tso, 480 F.2d 908, 178 USPQ 361 (CCPA 1973), in which one of our predecessor courts upheld the Board's award of prior conception for a narrowly defined count, based on evidence of a research plan proposing that various categories of aliphatic compounds be tested for their ability to inhibit the growth of axillary buds in tobacco plants. Id. at 910-11, 178 USPQ at 362-63. The determinative inquiry is not whether McGraw's disclosure was phrased certainly or tentatively, but whether the idea expressed therein was sufficiently developed to support conception of the subject matter of the interference count.

In this case, the Board explicitly found that only the exercise of ordinary skill, rather than extensive experimentation, would be required to reduce the conception

documented by Ward's May 20 e-mail to practice. Our review must ask whether this factual conclusion is supported by substantial evidence.

The Board's opinion sets forth several lines of evidence supporting its determination that Ward's e-mail documents esters of the count with sufficient specificity to satisfy conception of the count. The Board noted that the Carswell '343 patent, which Jolley admits was referenced by Ward's May 20 e-mail, included claims specifically directed to pentaerythritol esters with acid moieties having 4 to 18 carbon atoms, those with 4 to 8 carbon atoms being within the scope of the count. Ward and McGraw also testified that they specifically contemplated the use of pentaerythritol esters having acid moieties of 4 to 18 carbon atoms, where such esters with 4 to 8 carbon atoms are within the scope of the count, and discussed with each other the prospects for a lubricant blend comprising these esters along with a polyol lubricant component.

Jolley argues that this evidence is insufficient as a matter of law to support the Board's conclusion that McGraw was entitled to a May 20 conception date. According to Jolley, Ward and McGraw's testimony may not be relied on to establish their conception, because that testimony was not corroborated by a noninventor. Jolley is correct, of course, that inventor testimony regarding conception must be corroborated. Price v. Symsek, 988 F.2d 1187, 1194-95, 26 USPQ2d 1031, 1036-37 (Fed. Cir. 1993). Yet the Board's opinion explicitly sets forth corroborating testimony. Rhetta Davis, McGraw's supervisor, testified that Dow's Industrial Polyglycols division was manufacturing a polyol/ester lubricant of the type described by the Carswell '343 patent, which had as its ester component a product purchased from Mobil named P51. Mobil P51 ester was an ester of pentaerythritol and alkanolic acids having 7 to 9 carbon

atoms, and mixtures of P51 with an HFC refrigerant lie within the scope of the count. Thus, Davis testified that she expected that blends of polyols and pentaerythritol esters would be among the first esters to be evaluated in the program proposed in Ward's e-mail.

Jolley, however, relies on Boises v. Benedict, 27 F.3d 539, 30 USPQ2d 1862 (Fed. Cir. 1994), to argue that Davis's testimony represents an impermissible attempt to confer specificity to an incomplete written conception on the basis of what a noninventor thought the disclosure meant. In Boises, the documentary evidence of conception consisted of the inventor's laboratory notebook, disclosing a generic formula with the length of a hydrocarbon chain designated as "n." To prove that this formula disclosed a compound within the scope of the count, which required a hydrocarbon chain containing from 2 to 8 carbon atoms, Benedict submitted evidence from a technician who witnessed the notebook, testifying that the technician understood this formula to include compounds where $n = 1$ and $n = 2$. Id. at 541, 30 USPQ2d at 1864. We held that, because the conception inquiry is addressed to whether the inventor held the idea of the invention in his or her mind, a witness's own interpretation of what the formula meant was not probative of what the inventor had in fact conceived. Id. at 543, 30 USPQ2d at 1865. In the absence of any other evidence as to what the inventor conceived, the Board's conclusion that Benedict had established conception by a preponderance of the evidence was unsound.

Boises, however, was not a corroboration case. Because conception is a mental act, evidence of conception must ultimately address whether the inventor formed "the definite and permanent idea of the complete and operative invention" in his or her mind.

Evidence of whether a noninventor envisioned the count limitations upon perusing the inventor's disclosure is relevant only insofar as it may address what the inventor's disclosure would mean to one of ordinary skill in the art.³ Hence, as in Boises, if there is no evidence in record that all of the elements of the count resided in the inventor's mind, a noninventor's testimony cannot supply the missing pieces. But in the present case, there is no dispute that Ward's e-mail discloses a group of esters including esters of the count, and there is ample testimony from the inventors concerning their particular interest in pentaerythritol esters. Davis's testimony is offered to corroborate the inventors' own testimony that Dow was in the business of producing polyol/ester lubricants comprising Mobil P51, a pentaerythritol ester within the scope of the count. It is the inventors' participation in Dow's ongoing program employing pentaerythritol esters as lubricants, not Davis's personal reaction to Ward's e-mail, that corroborates the inventors' testimony regarding their preference for pentaerythritol esters. Corroboration may be established by "sufficient circumstantial evidence of an independent nature," Cooper, 154 F.3d at 1330, 47 USPQ2d at 1903, and the

³ Of course, as most people of sound mind who speak do so with a listener in mind, proof of conception may involve (as here) testimony explaining the specific meaning of an inventor's words in light of the particular audience to which they are directed.

inventors' involvement with Dow programs employing pentaerythritol esters is circumstantial corroboration of their interest in these compounds. Therefore, the Board was not precluded from relying on Davis's testimony to corroborate that of Ward and McGraw.

Jolley's allegations of an absence of corroboration also fail in light of other evidence cited by the Board. It is significant that when the inventors actually began to test esters for the utility of the count (compatibility with R134a), they turned first to an ester within the scope of the count. From the Board's opinion, it appears that McGraw's first solubility experiment with an ester and R134a employed Mobil P51, the pentaerythritol ester in use for polyol/ester lubricant blends at Dow and meeting the ester limitations of the count. The inventors did not engage in extensive experimentation with those esters that were encompassed by the face of Ward's e-mail but lie beyond the scope of the count—experimentation that would have belied the notion that Ward and McGraw held a preference for the esters of the count when they conceived their invention. See Burroughs Wellcome, 40 F.3d at 1230, 32 USPQ2d at 1920; Alpert v. Slatin, 305 F.2d 891, 894, 134 USPQ 296, 299 (CCPA 1962). Of course, the conception inquiry asks whether the inventors embraced the invention in their minds as of the date alleged. Whether or not subsequent testing succeeded or failed, or even took place, does not determine whether conception was complete as of that date. The evidence of the inventors' idea must be objective, however, and as an evidentiary matter the fact that the inventors turned first to a pentaerythritol ester of the count, to the exclusion of other possibilities, serves as circumstantial corroboration of their preference for such esters as lubricants that would be compatible with HFC

refrigerants. One plausible interpretation of these events is fortuitous coincidence; another is objective documentation of the completeness of conception. We do not sit to second-guess the Board in such situations. As such, we must uphold as supported by substantial evidence the Board's conclusion that McGraw's inventors knew of the desirability of the esters within the scope of the count, or at least that the desirability of those esters could be ascertained without extensive experimentation.

We conclude, therefore, taking into account the evidence that supports the Board's conclusion and that which weighs against it, that a reasonable mind might accept as adequate the evidence that as of May 20, 1988, McGraw held the definite and permanent idea of a composition meeting the limitations of the count, and disclosed that idea with sufficient particularity to fairly suggest to one of ordinary skill in the art the subject matter of the count. Accordingly, we affirm the Board's award of priority of conception to McGraw.

II

One who is first to conceive but last to reduce to practice is entitled to priority only on a showing of reasonable diligence extending from a time prior to the other party's conception to its own reduction to practice. 35 U.S.C. § 102(g) (2000); Marhurkar v. C.R. Bard, Inc., 79 F.3d 1572, 1578, 38 USPQ2d 1288, 1291 (Fed. Cir. 1996). Jolley alleged a conception date of June 2, 1988, and the Board credited Jolley with an actual reduction to practice on June 19, 1988. Thus, to achieve priority of invention, McGraw was required to demonstrate diligence in reducing the invention to practice for a period extending from just prior to Jolley's conception (which we assume

for purposes of this appeal is June 2, 1988, although the Board made no specific finding) through McGraw's own reduction to practice.

The Board found, and Jolley does not contest, that McGraw reduced to practice a two-component (ester/refrigerant) system meeting all limitations of the count on September 21, 1988, and reduced to practice three-component (polyol/ester/refrigerant) systems meeting all limitations of the count on October 19 and 25, 1988. McGraw thus reduced to practice the invention as conceived on October 19 and 25, despite having also reduced to practice an embodiment within the scope of the count on September 21. Because Jolley does not on appeal challenge the continuity of McGraw's inventive activity, any complications arising from McGraw's separate reductions to practice need not concern us. The question is whether McGraw exercised reasonable diligence in the period leading up to these reductions to practice.

Inventor McGraw explained in testimony that, following conception of the three-component system documented by the May 20, 1988 e-mail, he and Ward pursued a specific plan to reduce the invention to practice. According to McGraw, he and Ward decided to first identify polyglycols that were soluble in R134a. Separately, they would screen candidate esters for solubility in R134a. Having selected individual polyglycols and esters soluble in R134a, they would mix the polyglycols and esters together and test the blends for solubility in R134a.

McGraw documented various activities on the part of inventors Ward and McGraw from May 1988 through October 1988 in pursuit of the alleged plan for reducing the three-component system to practice. These activities included acquiring samples of R134a and special glassware needed to assess solubility, conducting

multiple tests of polyglycol solubility in R134a, obtaining more R134a when the initial supply was exhausted, the successful testing of pentaerythritol ester solubility in R134a on September 21, and testing more esters and polyols for solubility, culminating finally in successful reductions to practice of an ester/polyglycol/refrigerant system on October 19 and 25. The Board found that any gaps of inactivity in this inventive record were excusable by "reasonable everyday problems and substantiated employment limitations", i.e., the inventors' other duties, and Jolley does not contest these findings on appeal.

Jolley's attack on McGraw's case for diligence is relatively straightforward. The count in question relates to ester lubricants. While McGraw asserts that it conceived of a lubricant comprising an ester within the scope of the count by May 20, 1988, McGraw did not perform any tests on ester solubility until September 21, 1988. The only solubility experiments conducted from May 20 to September 21 were performed on mixtures of R134a and polyglycol lubricants: mixtures outside the scope of the count. Jolley contends that the Board thus improperly credited to McGraw activities at best directed to the invention of the '144 patent, a narrower patent specifically directed to three-component systems including polyglycols as lubricants. At worst, Jolley contends, these activities were directed to polyglycol/refrigerant systems without any esters at all, because Ward's May 20 e-mail, while proposing polyglycol/ester blends as lubricants, also suggests that Dow's research program might identify polyglycol lubricants that work well even in the absence of an ester. Thus, argues Jolley, McGraw's work on polyglycol solubility in R134a would be consistent with diligence toward a pure polyglycol lubricant—an independent invention completely outside the scope of the count.

The Board responded to Jolley's arguments by reminding Jolley that three-component systems comprising polyglycols are within the scope of the count, since the count is open to additional ingredients in the refrigerant/ester composition. According to the Board, it was a reasonable course for McGraw and Ward to fully explore the properties of simpler systems—polyglycol/R134a and ester/R134a compositions—before combining both lubricants into a three-component system. We agree with the Board that because all claims of all parties correspond to the same count, whether or not McGraw secured an additional patent on a three-component system is immaterial to the question of whether McGraw was working to reduce to practice an embodiment falling within the scope of the present count.

There are, of course, limits to the Board's logic. The count is open not only to the addition of polyglycols, but also to any conceivable substance that might function as a lubricant. We doubt that Ward could set forth as evidence of diligence experiments on the properties of maple syrup, under the theory that the count is open to lubricant compositions employing maple syrup as an additional lubricant. There must be either a direct point of attachment to the subject matter of the count, or a context established by other evidence in which otherwise isolated experimentation is seen as part of an overall scheme of inventive activity directed toward reducing the invention to practice. Here, that context is established by Ward's May 20 e-mail setting forth the idea of an ester/polyglycol blend lubricant, and by inventor McGraw's testimony that he and Ward chose to screen polyglycol candidates for solubility as the first step in developing the three-component system.

As he did with McGraw's evidence of conception, Jolley contends that a lack of corroboration precludes the Board from relying on McGraw's testimony that the polyglycol solubility experiments were performed in pursuit of the three-component system and not some other invention. Jolley is correct that corroboration is required to support an inventor's testimony regarding his reasonable diligence in pursuit of the invention. Price, 988 F.2d at 1196, 26 USPQ2d at 1038. If the Board had relied on no more than McGraw's testimony to place the polyglycol solubility experiments in the context of an effort to develop a three-component system, its determination would be suspect.

While the Board did rely most heavily on McGraw's testimony to substantiate the existence of an overall scheme for developing a three-component system, the Board's opinion also states that the testimony of other witnesses, Lewis, Whitmarsh, and Nace, corroborated McGraw's testimony of diligence. The Board does not indicate whether these witnesses specifically corroborated Ward and McGraw's testimony regarding the place of the polyglycol solubility experiments in an overall plan to develop a three-component system, or simply corroborated the assertion that the solubility experiments were performed. But Jolley fails to show that the Board's reliance on these corroborating witnesses was unjustified. In fact, Jolley does not address the corroborating testimony at all. Moreover, corroboration may be provided by sufficient independent circumstantial evidence, and corroboration of every factual issue contested by the parties is not a requirement of the law. Cooper, 154 F.3d at 1330, 47 USPQ2d at 1904.

The Board cited as additional corroboration of this plan the fact that polyglycol/ester lubricant blends "had previously been studied and made the subject of Dow's patent applications filed by Carswell and Ward," consistent with McGraw and Ward's stated interest in developing a polyglycol/ester lubricant that would be compatible with R134a. The Board also referred to other surrounding circumstances lending credibility to McGraw and Ward's interest in polyglycol/ester lubricants versus pure polyglycols: the inventors' belief that the discovery of a lubricant comprised of polyglycols alone would not yield a strong proprietary position for Dow. Like the Board, we find this motivation highly plausible. We agree with the Board that the circumstantial evidence provides sufficient corroboration of Ward and McGraw's research plan, and we therefore find supported by substantial evidence the Board's determination that the polyglycol solubility experiments were carried out in pursuit of a three-component ester/polyglycol/refrigerant system falling within the limitations of the interference count.

Jolley's argument, reduced to its essentials, is that when faced with evidence consistent with pursuing either an invention inside the count (a polyglycol/ester lubricant blend), or an invention outside the count (a lubricant comprising polyglycols alone), the Board erred by crediting the evidence of diligence toward an invention of the count. Although efforts toward a solution of the problem at hand by different means than those represented by the count will not be credited as diligence, see Mycogen Plant Sci., Inc. v. Monsanto Co., 252 F.3d 1306, 1315, 58 USPQ2d 1891, 1898 (Fed. Cir. 2001), we decline to adopt a rule that evidence of diligence must be excluded if there is any possibility that it could be construed in support of an invention beyond the reach of the count. We agree that McGraw's polyglycol solubility experiments might be so

construed. But where two different, inconsistent conclusions may reasonably be drawn from the evidence in record, an agency's decision to favor one conclusion over the other is the epitome of a decision that must be sustained upon review for substantial evidence. See Grupo Industrial Camesa v. United States, 85 F.3d 1577, 1582 (Fed. Cir. 1996). Because the question of diligence is essentially one of fact, Martus & Becker v. Heiss, 39 F.2d 715, 717, 5 USPQ 74, 76 (CCPA 1930), our standard of review requires us to affirm the Board's determination that McGraw's experiments with polyglycol solubility showed reasonable diligence toward reducing to practice a three-component system meeting the limitations of the count.

Finally, Jolley argues that McGraw's testimony that the polyglycol solubility experiments taking place from May 20 to September 21 were in pursuit of an invention of the count is contradicted by a Dow invention disclosure statement made by the inventors for the subject matter of the '144 patent. That document records a conception date of May 20, 1988, but states that "the first work done on this invention" took place on September 26, 1988. Thus, Jolley argues that McGraw could not have been working to reduce to practice a three-component lubricant system until September 26 at the earliest. But such a statement made by inventors, whose definitions of "first work" and "invention" may bear little relationship to corresponding legal concepts, has little probative value. In any event, this evidence, even if weighed against the Board's conclusion, is insufficient to render the Board's factual determinations of diligence unsupported by substantial evidence.

We therefore affirm the Board's conclusion that McGraw exercised reasonable diligence during the period extending from prior to Jolley's conception through

McGraw's reduction to practice of embodiments meeting the limitations of the count. Because we likewise affirm the Board's conclusion that McGraw was first to conceive of the invention defined by the count, we hold that McGraw was entitled to priority of invention under 35 U.S.C. § 102(g).

III

In light of our affirmance of the Board's award of priority to McGraw, we do not address the Board's determination that Williamitis, U.S. Patent No. 2,807,155, anticipates Jolley's claims corresponding to the interference count. Jolley does not contest the Director's assertion that we need not reach the issue of anticipation if we affirm the Board's award of priority against Jolley.⁴ Given our holding that Jolley is not entitled to a patent by reason of McGraw's priority under 35 U.S.C. § 102(g), we need not consider Jolley's appeal on the unpatentability of his claims under § 102(a) or (b). Cf. Rexam Indus. Corp. v. Eastman Kodak Co., 182 F.3d 1366, 1369-70, 51 USPQ2d 1457, 1459-60 (Fed. Cir. 1999) (explaining that party whose claims are deemed unpatentable in an interference may nonetheless retain interest in establishing priority to defeat another's claims).

CONCLUSION

For the reasons set forth above, we find no error in the Board's determination that McGraw first conceived of the invention defined by the combined interference

⁴ Whether McGraw's claims are patentable over Williamitis was apparently neither argued nor decided during the course of the interference.

count, and that McGraw exercised reasonable diligence in reducing the invention to practice during a period extending from just prior to Jolley's later conception through McGraw's own reduction to practice. We therefore affirm the Board's award of priority of invention to McGraw.

COSTS

No costs.

AFFIRMED