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Paper 54
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FACEBOOK, INC., LINKEDIN CORP., and TWITTER, INC.,
Petitioner,

v.

SOFTWARE RIGHTS ARCHIVE, LLC,
Patent Owner.

Case IPR2013-00479
Patent 5,832,494

Before SALLY C. MEDLEY, CHRISTOPHER L. CRUMBLEY, and BARBARA A. PARVIS, *Administrative Patent Judges.*

CRUMBLEY, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. BACKGROUND

A. Introduction

On July 30, 2013, Facebook, Inc., LinkedIn Corp., and Twitter, Inc. (collectively, "Petitioner") filed a Petition requesting an *inter partes* review of claims 18–20, 45, 48, 49, 51 and 54 of U.S. Patent No. 5,832,494 (Ex. 1201, "the '494 patent"). Paper 2 ("Pet."). On February 3, 2014, we

instituted trial on all challenged claims, on certain of the grounds of unpatentability alleged in the Petition. Paper 18 ("Decision to Institute" or "Inst. Dec.").

After institution of trial, Software Rights Archive, LLC ("Patent Owner"), filed a Patent Owner Response ("PO Resp."). Paper 31. Petitioner also filed a Reply. Paper 40 ("Reply").

A consolidated oral hearing for IPR2013-00478, IPR2013-00479, IPR2013-00480, and IPR2013-00481, each involving the same Petitioner and the same Patent Owner, was held on October 30, 2014. The transcript of the consolidated hearing has been entered into the record. Paper 53, "Tr."

We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

Petitioner has shown by a preponderance of the evidence that claims 18–20, 45, 48, 49, 51 and 54 of the '494 patent are unpatentable.

B. Related Proceedings

Petitioner and Patent Owner both indicate that the '494 patent is involved in the following co-pending district court proceedings: *Software Rights Archive, LLC v. Facebook, Inc.,* Case No. 12-cv-3970; *Software Rights Archive, LLC v. LinkedIn Corp.,* Case No. 12-cv-3971; and *Software Rights Archive, LLC v. Twitter, Inc.,* Case No. 12-cv-3972, each pending in the United States District Court for the Northern District of California. Pet. 1; Paper 9, Patent Owner's Mandatory Notice, 2.

Petitioner filed another Petition seeking, and we instituted, *inter partes* review of other claims of the '494 patent in Case IPR2013-00480. In addition, we instituted trial on Petitioner's petitions on related patents including: (1) IPR2013-00478, which seeks *inter partes* review of U.S.

Patent No. 5,544,352 (the "'352 patent") and (2) IPR2013-00481, which seeks *inter partes* review of U.S. Patent No. 6,233,571 (the "'571 patent"). The '352 patent issued from the parent of the application that issued as the '494 patent. The '571 patent issued from an application that was a divisional of the application that issued as the '494 patent. The '494 patent was the subject of Reexamination No. 90/011,014.

C. The '494 patent

The '494 patent relates to computerized research on databases. Ex. 1201, 1:11–13. The '494 patent discloses that it improves search methods by indexing data using proximity indexing techniques. *Id*. at 3:20–31. According to the '494 patent, proximity indexing techniques generate a quick-reference of the relations, patterns, and similarity found among the data in the database. *Id*. at 3:28–31.

Figure 2 of the '494 patent illustrates the high-level processing of software for computerized searching (*Id*. at 8:7–8) and is reproduced below:

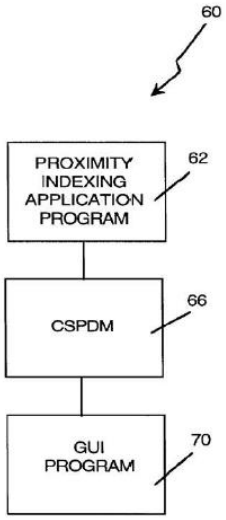

Fig. 2

> Figure 2 depicts software system 60 comprising Proximity Indexing Application Program 62, Computer Search Program for Data Represented by Matrices ("CSPDM") 66, and Graphical User Interface ("GUI") program 70.

Ex. 1201, 11:29–36.

Processing of software system 60 begins with Proximity Indexing Application Program 62 indexing a database. *Id*. at 11:46–47. Then, CSPDM 66 searches the indexed database and retrieves requested objects. *Id*. at 11:49–53. CSPDM 66 relays the retrieved objects to GUI program 70 to display on a display. *Id*. at 11:53–55.

Software system 60 runs on a computer system comprising, for example, a processor of a personal computer. *Id*. at 10:11–15. The system comprises a display, which displays information to the user. *Id*. at 10:43–44. Exemplary displays include: computer monitors, televisions, LCDs, or LEDs. *Id*. at 10:44–46.

The processor is connected to a database to be searched. *Id*. at 10:18–20. Data in the database may be represented as a node. *Id.* at 12:29–33. Exemplary nodes include an object or a portion of an object, a document or section of a document, and a World Wide Web page. *Id*. at 12:35–38.

A cluster link generation algorithm may be used alone or in conjunction with other proximity indexing subroutines, and prior to searching. *Id*. at 21:30–33. The cluster link generation algorithm may generate candidate cluster links (*Id*. at 21:64–66) and then derive actual cluster links, which are used to locate nodes for display (*Id*. at 22:1–4). Actual cluster links are: "a subset of the candidate cluster links . . . which meet a certain criteria." *Id*. at 22:1–4.

D. Illustrative Claim

Of the challenged claims, only claim 18 is independent, whereas claims 19–20, 45, 48, 49, 51 and 54 depend directly or indirectly from claim 18. Claim 18 is illustrative of the claimed subject matter and is reproduced below:

> 18. A method of analyzing a database having objects and a first numerical representation of direct relationships in the database, comprising the steps of:
>
> generating a second numerical representation using the first numerical representation, wherein the second numerical representation accounts for indirect relationships in the database;
>
> storing the second numerical representation;
>
> identifying at least one object in the database, wherein the stored numerical representation is used to identify objects; and
>
> displaying one or more identified objects from the database.

Ex. 1201, 53:27–39.

E. The Prior Art References Upon Which Trial Was Instituted

Colin F.H. Tapper, *Citation Patterns in Legal Information Retrieval*, 3 DATENVERARBEITUNG IM RECHT 249–75 (1976) ("Tapper 1976") (Ex. 1204).

Colin Tapper, *The Use of Citation Vectors for Legal Information Retrieval*, 1 J. OF LAW AND INFO. SCI. 131–61 (1982) ("Tapper 1982") (Ex. 1205).

Edward A. Fox, *Characterization of Two New Experimental Collections in Computer and Information Science Containing Textual and*

Bibliographic Concepts (Sept. 1983) (Ph.D. dissertation, Cornell Univ. Dep't of Comp. Sci.) ("Fox Collection") (Ex. 1206).

Edward A. Fox, *Some Considerations for Implementing the SMART Information Retrieval System under UNIX* (Sept. 1983) (Ph.D. dissertation, Cornell Univ. Dep't of Comp. Sci.) ("Fox SMART") (Ex. 1208).

Edward A. Fox, *Extending the Boolean and Vector Space Models of Information Retrieval with P-Norm Queries and Multiple Concept Types* (Aug. 1983) (Ph.D. dissertation, Cornell Univ. Dept. of Comp. Sci.) ("Fox Thesis") (Ex. 1209).

Edward A. Fox, et al., *Users, User Interfaces, and Objects: Envision, a Digital Library*, 44 J. AM. SOC. INF. SCI. 480–91 (Sept. 1993) ("Fox Envision") (Ex. 1210).

Tatsuki Saito, *A Clustering method using the strength of citation*, 16 J. INF. SCI. 175–81 (Jan. 1990) ("Saito Clustering") (Ex. 1212).

Thomas D.C. Little, *Commerce on the Internet*, IEEE Multimedia at Work 74–78 (1994) ("Little") (Ex. 1216).

The parties do not dispute the prior art status of the references.

F. The Pending Grounds of Unpatentability

References	Basis	Claims instituted
Fox Thesis, Fox SMART, and Fox Collection	§ 103	18–20, 48, and 49
Tapper 1976 and Tapper 1982	§ 103	18–20, 48, and 49
Fox Thesis, Fox SMART, Fox Collection, Saito Clustering, and Fox Envision	§ 103	45 and 51
Fox Thesis, Fox SMART, Fox Collection, Saito Clustering, Fox Envision, and Little	§ 103	54

II. ANALYSIS

A. Claim Construction

1. Principles of Law

Petitioner asserts, and Patent Owner does not dispute, that the '494 patent expired on June 14, 2013. Pet. 6. The Board's interpretation of the claims of an expired patent is similar to that of a district court's review. *See In re Rambus, Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012). We, therefore, are guided by the principle that the words of a claim "are generally given their ordinary and customary meaning," as understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc) (citation omitted). "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). There is a "heavy presumption," however, that a claim term carries its ordinary and customary

meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citation omitted).

2. Overview of the Parties' Positions

In the Decision to Institute, we found it instructive to construe the claim terms *direct relationships* and *indirect relationships*. Inst. Dec. 10–11. Our constructions are set forth in the table below.

Claim Term or Phrase	Construction
direct relationships	"relationships where one object cites to another object" Inst. Dec. 11.
indirect relationships	"relationships where at least one intermediate object exists between two objects and where the intermediate object(s) connect the two objects through a chain of citations" Inst. Dec. 11.

Petitioner does not challenge any of our constructions. Reply 1–2. Patent Owner appears to agree with many of our constructions, and states that it uses our constructions for the purpose of evaluating patentability of the challenged claims of the '494 patent. PO Resp. 8–11. Based on the complete record now before us, we discern no reason to change our prior constructions.

Additionally, Patent Owner addresses the terms *computerized database* and *numerical representation of direct relationships* which are evaluated below. PO Resp. 8–11. Petitioner's Reply further addresses *database* and *numerical representation*. Reply 1–2.

3. computerized database

Patent Owner asks that we construe *computerized database*, and asserts that "the claims of the '494 patent are methods that are directed to

representing, analyzing, and searching objects *in a computer database* having direct and indirect relationships *between objects in the database*." PO Resp. 8 (emphasis in original). The phrases *computerized database* or *computer database*, however, appear nowhere in the claims of the '494 patent that are subject to this trial.

To the extent that the Patent Owner wishes for us to construe *database*, which does appear in the claims, Petitioner correctly notes that the specification of the '494 patent states that the database "can be any device which will hold data" such as "any type of magnetic or optical storing device." Ex. 1201, 10:18–21. We do not consider the term to need any additional construction.

4. numerical representation

Patent Owner asks for a construction of *numerical representation of direct relationships*, proffering the interpretation "a numerical value or set of values that represent direct relationships in a computer database." PO Resp. 11. Patent Owner distinguishes these numerical representations from "strings," which may include letters. *Id*. at 7. At oral argument, Patent Owner confirmed that its construction of *numerical representation* is something "represented only by digits," or in other words "expressed by numbers, not by letters." Tr. 85.

Petitioner responds that *numerical* includes "any representation of binary or digital data that can be processed and analyzed by a computer," and means simply "of or relating to numbers." Reply 1; Tr. 13. Petitioner's construction is, therefore, not limited to representations consisting only of numbers. At oral argument, Petitioner argued that the inclusion of a single

number into a string is sufficient to make that string a *numerical representation*. Tr. 25.

Petitioner's proffered construction is overly broad and unsupported by the specification. While one dictionary definition of *numerical* is "of or relating to a number or series of numbers," it may also refer to "expressed in or counted by numbers." THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE (2000) (Ex. 3001); *see also* COLLINS ENGLISH DICTIONARY (2000) (Ex. 3002) ("measured or expressed in numbers").

The specification of the '494 patent uses *numerical* consistent with this latter interpretation. In the Initial Extractor Subroutine, the "full textual objects" of the database are numbered "with Arabic numbers from 1 through n." Ex. 1201, 16:64–65. These numbers are used to create vectors and matrices, which are then run through various algorithms such as the Opinion Patterner Subroutine. *Id*. at 17:3–37. "Numerical factors" are then "calculated" to determine "values." *Id*. at 17:34–37; 21:10–14. This emphasis on calculation, values, and on processing by computer algorithms, leads us to conclude that *numerical representation*, as used in the '494 patent specification, must refer to solely numbers, so that a computer can process the representations using mathematical algorithms.

Petitioner's attempt to link the *numerical representation* of the specification to the West "key number" system is unpersuasive. Reply 2. While the specification of the '494 patent does discuss the key number system, and such "key numbers" include letters, there is no indication that the patentee intended to link the *numerical representation* of the claims to the West key number system discussed—and distinguished—in the

background portion of the specification. Ex. 1201, 2:25–29 ("such a numbering process is subjective and is prone to error").

Nor do we find persuasive Petitioner's argument that *numerical* is somehow distinct from "numeric," in that the latter term means only numbers but the former may encompass letters. Tr. 13. Not only was this argument advanced for the first time at oral hearing,[1] but it is unsupported by any evidence of record. Indeed, the two terms are used interchangeably in dictionary definitions. *See* Ex. 3001 (entry for "numerical also numeric"); Ex. 3002 (entry for "numerical or numeric").

For these reasons, we construe *numerical representation* as "representation consisting exclusively of numbers or a set of numbers."

B. Obviousness of Claims 18–20, 48, and 49 Over the Fox Papers

We instituted trial to determine whether claims 18–20, 48, and 49 are unpatentable under 35 U.S.C. § 103 as having been obvious over the combined disclosures of Fox Thesis, Fox SMART, and Fox Collection (collectively, "the Fox Papers"). Inst. Dec. 12–16. In support of the asserted ground of unpatentability, Petitioner sets forth the teachings of the cited prior art, provides detailed claim charts, and cites to the declaration of Dr. Fox (Ex. 1218 ¶¶ 182–210), explaining how each limitation is taught in the cited prior art combination. Pet. 8–18.

We have considered Petitioner's arguments and evidence, as well as the counterarguments in Patent Owner's Response, and the evidence cited therein, and conclude that Petitioner has shown by a preponderance of the

[1] Our Rules do not permit arguments to be raised for the first time at oral hearing. 37 C.F.R. § 42.70(a) (permitting oral argument only on "an issue raised in a paper.").

evidence that each of claims 18–20, 48, and 49 of the '494 patent is unpatentable, under 35 U.S.C. § 103, as having been obvious over the Fox Papers.

1. Fox Thesis

Fox Thesis describes improving query and document representation schemes for information retrieval. Ex. 1209, 261. In particular, useful types of bibliographic data are incorporated into a model to test clustering and retrieval functions. *Id.* at 164. Bibliographic connections between articles are illustrated for an exemplary set "O" of documents, which are represented by letters A through G. *Id*. at 165–66, Fig. 6.2. This exemplary set "O" includes direct and indirect citation references. *Id.* at 166–67, Table 6.2.

Based on the reference pattern for a set of documents, Fox Thesis describes deriving various measures of the interconnection between the documents. *Id*. at 166. For example, weights are assigned "based upon integer counts" for bibliographically coupled documents. *Id.* at 167. Citation submatrices represent reference or citation information. *Id*. at 169–70. For example, submatrix *bc* represents bibliographically coupled reference information and submatrix *cc* represents co-citation reference information. *Id*. at 169–72, Figs. 6.3–6.5.

2. Fox SMART

Fox SMART describes the System for Mechanical Analysis and Retrieval of Text (SMART) as a project for designing a fully automatic document retrieval system and for testing new ideas in information science. Ex. 1208, 3. Fox SMART describes the computer system used to implement the experiments described in the Fox Thesis. Ex. 1218 ¶ 27. The software components of SMART are implemented in the C Programming Language

and run under the UNIX™ operating system on a VAX™ 11/780 computer. Ex. 1208, 1, 4.

In SMART, an automatic indexing component constructs stored representations of documents. *Id*. at 3. Bibliographic information is used to enhance document representations. *Id*. at 29. The SMART system may process basic raw data, such as an exemplary "N" collection of articles and citation data describing which articles are cited by others. *Id*.at 29–30. Data is entered into the SMART system as a set of tuples $\{(d_i, d_j)|d_i \rightarrow d_j\}$ which describe the cited and citing documents, as well as the direction of citation. *Id*. at 29. The exemplary input data also includes indirect citation relationships, such as bibliographic coupled and co-citation relationships. *Id*. at 30–32. These relationships are used to create extended vectors which can then be clustered and searched to aid document retrieval. *Id*. at 29.

3. Fox Collection

Fox Collection describes collections of data which are said to be useful for investigating the interaction of textual and bibliographic data in retrieval of documents. Ex. 1206, 1. According to the testimony of Dr. Fox, Fox Collection was originally part of the same work as Fox Thesis and Fox SMART, and describes the manner in which the data sets were obtained and processed prior to their use in the Fox SMART experiments. Ex. 1218 ¶ 27.

According to Fox Collection, the experiments were performed on a collection of bibliographic records (title, abstract, author, keywords, etc.) from the *Communications of the ACM*, termed the "CACM collection." Ex. 1206, 14.[2] Two individuals then examined printed copies of the articles

[2] The Fox Collection also discusses an ISI Collection, but in his Reply Declaration Dr. Fox explains that he cites the ISI collection to "emphasize

referenced by the CACM bibliographic records, and citation data was obtained from the articles and entered into a set Raw_data. *Id*. The citation data contained pairs of identifiers (citing, cited) which were the document id numbers ("dids") of the citing record and record it cites. *Id*. From this Raw_data matrix, secondary matrices such as bc (bibliographic coupling) and cc (co-citation) were derived computationally. *Id*. at 14–16.

4. Claim 18

Petitioner's claim chart persuasively reads all elements of claim 18 onto the combined teachings of Fox Thesis, Fox SMART, and Fox Collection. Pet. 9–14 (citing Ex. 1206, 14–15, 45–46; Ex. 1208, 3, 11–13, 23–24, 26–27, 29–32, 38, 41–54, 58–59; Ex. 1209, 17, 19, 173, 179, 181–83, 194, 201, 207, 211, 213; 1218 ¶¶ 71–108, 122–131, 182–184, 194–196). For instance, the combination of Fox Thesis, Fox SMART, and Fox Collection teaches a database having objects, and a first numerical representation of direct relationships in the database, as recited in claim 26. In particular, Fox Collection teaches a database containing the CACM collection of bibliographic entries. Ex. 1206, 14. Printed copies of each article with a bibliographic entry in the CACM collection are then manually reviewed, to obtain bibliographic subvectors in the form "Raw_data (cited, citing)," and the results entered into the database *Id*. This is a first numerical representation of the direct relationship between the "cited, citing" pair.

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findings in the prior art about the value of using co-citation data (a non-semantic indirect relationship) in information retrieval, not to fully address all the elements of claims. . . . For the sake of simplicity, the Board should focus on the methodology given in Fox Papers, and the examples of their use with the CACM Collection." Ex. 1233 ¶ 6.

The combination of Fox Thesis, Fox SMART, and Fox Collection also teaches generating a second numerical representation using the first numerical representation, wherein the second numerical representation accounts for indirect relationships in the database, as recited in claim 18. Fox SMART teaches that direct relationships may be represented by tuples called "CITED," which contain a citing document, a cited document, and the direction of the citation. Ex. 1208, 29. These tuples are then processed to construct submatrices such as *bc* and *cc*, which contain numbers representing indirect relationships. *Id*. at 30–32 ("construct BC by counting the number of identical tuples of C"). Dr. Fox testifies that the CITED tuples of Fox SMART refer to the Raw_data derived from the CACM collection. Ex. 1218 ¶ 124. Because these *bc* and *cc* submatrices are numerical representations, are generated from the first numerical representations CITED which are based on direct relationships, and account for indirect relationships, we find that the Fox Papers together teach generating a second numerical representation.

a. Combination of References

As to whether Petitioner has satisfied the requirements for combining the teachings of Fox Thesis, Fox SMART, and Fox Collection, we determine that Petitioner has articulated sufficient reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the retrieval systems taught in Fox Thesis, Fox SMART, and Fox Collection. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Dr. Fox states that the three publications arose from the same thesis project, and were originally one document. Ex. 1218 ¶ 70. Furthermore, Dr. Fox notes that Fox Thesis

"explain[s] the method and experimental results of [his] information retrieval work," Fox SMART "detail[s] the updated SMART computer system used to execute the experiments," and Fox Collection "describes how the data sets were obtained and processed prior to being used in the experiments." *Id*. We give Dr. Fox's statement that one of skill in the art would have been motivated to combine the references because they "describe a complete project with its underlying system and data" (*id*.) substantial weight, because it is consistent with the considerable overlap in the disclosures of the Fox Papers and their internal references to one another. *See*, *e.g.*, Ex. 1209, 343 (Fox Thesis cites to Fox SMART); Ex. 1208, 84 (Fox SMART cites to Fox Thesis).

b. Patent Owner's Counterarguments

We have considered Patent Owner's counterarguments and do not find them persuasive. Patent Owner contends that various elements of claim 18 are not taught or suggested by the Fox Papers in combination. First, Patent Owner argues that the Fox Papers do not teach analyzing a database having objects and a first numerical representation of direct relationships in the database. PO Resp. 21. In particular, Patent Owner focuses on the fact that the first numerical representation of Raw_data was not derived from objects in the database, but rather from manually reviewing the full articles to which the objects pertain. *Id*. at 22. Patent Owner concludes that "there is simply no database disclosed with objects citing to other objects, and Raw_data cannot be based upon 'an object's direct relationships with other objects in the database.'" *Id*. at 23.

There is no requirement in claim 18, however, that the first numerical representation be "based on" objects in the database. The preamble of claim

18 assumes a pre-existing database that contains two things: objects, and a first numerical representation of direct relationships. Once the Raw_data pairs were compiled and entered into the CACM database, as disclosed in Fox Collection (Ex. 1208, 14), these requirements were met.

Even if claim 18 did require the objects of the database to have direct and indirect relationships, Petitioner persuasively argues this feature is suggested by the Fox Papers in combination. For example, Petitioner shows persuasively that that it would have been obvious to modify the databases of the Fox Papers to contain full text documents. Reply 4. Dr. Fox's testimony supports this argument, noting that if storage resources allowed storage of the full text of documents, this would have been understood as preferable. Ex. 1218 ¶¶ 76, 89. We credit Dr. Fox's testimony on this point, as it is consistent with the disclosure of Fox Thesis that "some [information retrieval] systems store the full text of the various documents." Ex. 1209, 6. Fox Thesis adds that full text permits users to "locate documents of interest," as well as "retrieve and/or examine paragraphs, passages, sentences, or single word occurrences (in context)." *Id*. These extra capabilities are described as "straightforward generalizations of document retrieval methods." *Id*.

Furthermore, if modified to include full text documents, Fox SMART teaches that it would be of "particular value" in such applications to compute vectors (a first numerical representation) for smaller items than just documents. Ex. 1208, 80. As an example, Fox SMART discusses computing vectors for verses and chapters of the Bible, subsets of the entire document. *Id*.

We, therefore, conclude that the Fox Papers suggested to one of ordinary skill in the art at the time of the invention the modification of the Fox databases to include full text documents. With such a modification, the databases would contain, as objects, the full text documents—or even subsets of the full text documents—and these objects would have direct and indirect relationships due to their citation of one another. Patent Owner's argument to the contrary is unpersuasive.

Patent Owner also argues that the Fox Papers do not teach or suggest displaying one or more identified objects from the database, as claim 18 requires. PO Resp. 25. Patent Owner emphasizes that the identifying and displaying steps of claim 18 must apply to objects in the same database. *Id*. Because, Patent Owner alleges, the identified objects of Fox SMART are the full articles which are not present in the database, the objects cannot be displayed. *Id*.

Fox SMART, however, discloses an operation in which documents are retrieved, and then desired portions of the text of the retrieved documents are displayed to the user. Ex. 1208, 24, Fig. 6; *see also id*. at 11 ("display of portions of text from selected top-ranked documents"). Because, as noted above, we find that the Fox Papers suggest that the objects in the database can be both full text documents, as well as portions of those documents,[3] we conclude that the displaying one or more identified objects requirement of claim 18 is met.

Patent Owner's remaining contentions relate to whether Petitioner has satisfied the requirements for combining the teachings of Fox Thesis, Fox

[3] "For example, a section, page, or paragraph of text taken from a longer text may be treated as a textual object." Ex. 1201, 14:2–4.

SMART, and Fox Collection. For example, Patent Owner contends that the systems disclosed in the individual Fox Papers are "narrowly tailored" and would not have been combined merely because of their common authorship. PO Resp. 16–21.

As indicated above, we determine that Petitioner has articulated sufficient reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the retrieval systems taught in Fox Thesis, Fox SMART, and Fox Collection. *See KSR*, 550 U.S. at 398. For example, Dr. Fox wrote each of Fox Thesis, Fox SMART, and Fox Collection. See Ex. 1209, i; Ex. 1208, 1; Ex. 1206, 1.

Patent Owner also contends that the Raw_data relation of Fox Collection could not be combined with the CITED tuples of Fox SMART, because they are "fundamentally incompatible." PO Resp. 17. In support of this argument, Dr. Jacobs testifies, for example, that CITED does not describe using document ids ("dids") while Raw_data does. Ex. 2113 ¶¶ 124–125. Dr. Fox testifies to the contrary, stating that the CITED tuples of Fox SMART specifically refer to the "Raw_data" derived from the CACM collection. Ex. 1218 ¶ 124. We give Dr. Fox's testimony on this point substantial weight, and do not credit Dr. Jacobs' testimony. Our determination is not only due to Dr. Fox's personal knowledge of the Fox Papers, but also supported by the descriptions of Raw_data and CITED in the references. The references indicate that both Raw_data and CITED contain pairs of document identifiers, with the sole difference being that CITED also contains a third data element that signifies the direction of the citation. Furthermore, while the description of CITED in Fox SMART is silent as to document ids, other portions of the document discuss dids which

are an "index in range 1 . . . N." Ex. 1208, 36. We do not consider the combination of Raw_data with CITED, or the combination of the systems of Fox Collection, Fox SMART, and Fox Thesis, to be beyond the level of ordinary skill in the art.

Patent Owner further contends that using indirect relationships in a computerized search system would not have been predictable at the time of the invention of the '494 patent. PO Resp. 48–50. In particular, Patent Owner contends that Google's introduction of its algorithms took experts in the field by surprise and was considered a major breakthrough. PO Resp. 49 (citing Ex. 2113 ¶ 431; Ex. 2114 ¶¶ 43–65). Patent Owner's contention is based on its view that the combined teachings of Fox Thesis, Fox SMART, and Fox Collection are not sufficient because they do not teach computerized searching of an electronic database. PO Resp. 54; *see also* Tr. 49 ("[T]he Fox papers by themselves don't get you there . . . every one . . . is directed to printed articles, not an electronic database."). According to Patent Owner, the prior art cited by Petitioner teaches experiments that are not directed to web based documents, "but rather are directed toward limited experimentation with bibliographic relationships existing among paper documents." PO Resp. 1.

We disagree with Patent Owner. For example, Fox SMART teaches an implementation in which software components of SMART are implemented in the C Programming Language and run under the UNIX™ operating system on a VAX™ 11/780 computer. Ex. 1208, 1, 4. In SMART, an automatic indexing component constructs stored representations of documents. *Id*. at 3. In light of the various teachings of Fox Thesis, Fox SMART, and Fox Collection discussed herein, we determine that Fox

Thesis, Fox SMART, and Fox Collection, taken together, teach or suggest computerized searching of an electronic database.

Patent Owner also contends that the inclusion of indirect relationships into search "degrades results," and therefore provides a teaching away from the invention. PO Resp. 51. As Patent Owner acknowledges, its evidence of degraded results does not teach away from the *combination* of the Fox Papers, but rather from the *modification* of the teachings of the Fox Papers to incorporate "an electronic database that has references to the objects in the database." Tr. 49–50. We found above, however, that the Fox Papers teach this feature. In addition, to the extent modification of the Fox Papers is necessary to meet claim 18, we have found that modification is expressly suggested by the Fox Papers themselves. The record is insufficient to establish a teaching away.

Patent Owner also asserts objective indicia of non-obviousness, focusing on Google's search engine using its PageRank algorithm. PO Resp. 57–60. As an initial matter, Patent Owner's contentions again appear to be based on its view that the combined teachings of Fox Thesis, Fox SMART, and Fox Collection are not sufficient because they do not teach computerized searching of an electronic database. *Id*. at 56 ("Link analysis technology applied to the Web, as claimed in the '494 patent and embodied in PageRank, satisfied a long felt need for improved computerized search." (citation omitted)); Tr. 60–61 ("[I]t certainly wouldn't have been obvious to one of ordinary skill based on Fox's work to extend these ideas from this paper collection to electronic databases."). For the reasons discussed above, we disagree with Patent Owner's view and determine that Fox Thesis, Fox

SMART, and Fox Collection, taken together, teach or suggest computerized searching of an electronic database.

Furthermore, we note that Patent Owner has not shown that the asserted success of a commercial embodiment of the '494 patent actually resulted from features recited in the claims of the '494 patent. Patent Owner has not provided sufficient evidence to support a nexus between claim 18 and the Google PageRank algorithm. Because Patent Owner has failed to provide the source code of PageRank, or any other detailed information beyond publicly-available, generalized hearsay statements about Google's search (Ex. 2051), the record is insufficient to prove that PageRank uses the method of claim 18. Without further information, even if PageRank's algorithm incorporates the method of claim 18, we cannot determine that Google's success is due to the method of claim 18, as opposed to other elements of the algorithm.

Patent Owner also points to Google's license of the '494 patent as evidence of nexus. PO Resp. 59–60. Patent Owner, however, admits that this license resulted in the settlement of a lawsuit (*id*.), which without additional contextual evidence, weighs against finding a nexus.

Additionally, we determine that in light of the weak showing of secondary considerations, the evidence of obviousness with respect to Fox Thesis, Fox SMART, and Fox Collection, is sufficient to support the conclusion that claim 18 would have been obvious. See *Leapfrog Enterprises, Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007). As discussed above, Petitioner has provided a strong case of obviousness.

Accordingly, even after considering the counterarguments in Patent Owner's Response, and the evidence cited therein, we find that Petitioner

has shown by a preponderance of the evidence that claim 18 is unpatentable as it would have been obvious over the combination of Fox Thesis, Fox SMART, and Fox Collection.

5. Dependent Claims

Petitioner's claim chart persuasively reads all elements of dependent claims 19, 20, 48, and 49 onto the teachings of Fox Thesis, Fox SMART, and Fox Collection, taken together. Pet. 11–21 (citing Ex. 1206, 14–16; Ex. 1208, 7–8, 10–11, 15, 20–21, 23–24, 29–33, 41, 53; Ex. 1209, 181–82, 237–38, 246–47; 1003 ¶¶ 78–88, 99–106, 108, 127–129, 131, 185–188, 192, 193, 197, 199, 201–05). For instance, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Fox Thesis, Fox SMART, and Fox Collection teaches that the identifying step comprising searching for objects in a database using the stored numerical representation, wherein direct and/or indirect relationships are searched, as required by claim 20. Fox SMART teaches a "p-norm query" example, in which a user can search for documents linked to, bibliographically coupled to, or co-cited with a previously retrieved document. Ex. 1208, 41, Fig. 14. Links represent direct relationships, while bibliographic coupling and co-citation are indirect relationships, thus satisfying claim 20's additional limitations.

We also conclude that Petitioner has shown by a preponderance of the evidence that the combination of Fox Thesis, Fox SMART, and Fox Collection teaches identifying objects using "the second numerical representation and semantical factors to rank objects for display," as recited in claim 48. Petitioner identifies several portions of the Fox Papers which allegedly teach this limitation. Pet. 16–17. For example, Petitioner notes the disclosure of Fox SMART that "it should be possible to rank the

documents retrieved by a Boolean search according to some other similarity function." *Id*. (citing Ex. 1208, 10). Petitioner also identifies Figure 14 of Fox SMART, which discloses sequentially searching using various concept types including terms (a semantical factor), followed by retrieval of documents using non-semantical terms such as bibliographic coupling. *Id*. (citing Ex. 1208, 41); Ex. 1233 ¶ 233.

Claim 49 requires that generating the second numerical representation considers the quantity of direct relationships between objects. We determine that Fox SMART teaches, for example, the construction of *bc* subvectors, which represent bibliographic coupling and therefore are second numerical representations. Ex. 1208, 31, Fig. 9. This process uses the CITED tuples to generate the *bc* subvectors, and "count[s] the number of identical tuples," which represent direct relationships. *Id*. at 30–31. We, therefore, conclude that Fox SMART teaches the additional limitation of claim 49.

Additionally, for the reasons discussed above with respect to claim 18, we determine that Petitioner has satisfied the requirements for combining the teachings of Fox Thesis, Fox SMART, and Fox Collection.

Again, we are unpersuaded by Patent Owner's counterarguments. Patent Owner argues that Petitioner has not proven by a preponderance of the evidence that all elements of the dependent claims are taught or suggested by the Fox Papers. PO Resp. 27–34. Some of these arguments are based on the fact that the databases of the Fox Papers do not include full text documents (*see, e.g., id.* at 29–30), while others are based on the alleged incompatibility between the Fox Collection Raw_data and the Fox SMART CITED tuples. *See, e.g., id.* at 31, 32. We find these arguments unpersuasive for the same reasons discussed above with respect to claim 18.

The Fox Papers suggest the inclusion of full text documents into the databases, and that such a modification could be beneficial.

Patent Owner also argues that claim 48's requirement of using the second numerical representation and semantical factors to rank objects for display is not met by the Fox Papers. *Id*. at 33. According to Patent Owner, Petitioner's argument conflates two distinct disclosures of Fox SMART: searching using indirect relationships (second numerical representation), but not ranking; or ranking, but not in the context of indirect relationships. *Id*. Dr. Jacobs testifies that "the claim specifically requires using the combination of the second numerical representation (alleged to be bc and/or cc) and 'semantic factors' together to rank objects for display." Ex. 2113 ¶ 272 (underlining in original).

We disagree with Patent Owner's interpretation of claim 48. The claim does not require, contrary to Dr. Jacobs's testimony, that the second numerical representation and the semantical factors be used *together*, but rather that they are both used to rank objects for display. The search operation of Figure 14 of Fox SMART discloses using both indirect representations and semantical factors sequentially (Ex. 1208, 41), which satisfies claim 48. Furthermore, Fox SMART discloses retrieving documents with "highest similarity" to a query, which necessarily requires ranking of the retrieved results by similarity. Indeed, Fox SMART teaches that "ranking of documents should be possible for any type of search method." Ex. 1208, 10. Dr. Fox testifies that "Figure 14 discloses that the user can input any desired [concept types], including semantical . . . and the indirect relationship . . ., to obtain a set of search results with the documents

ranked based on those factors." Ex. 1233 ¶ 233. We find this testimony credible and consistent with the disclosure of Fox SMART.

With respect to claim 49, Patent Owner contends that the Fox Papers do not teach or suggest considering "a quantity of direct relationships" when generating the second numerical representation, because "the 'counting' in the Fox Papers alleged to teach the features of claim 49 refer to counting indirect relationships, not direct links." PO Resp. 34. As discussed above, we find that Figure 9 of Fox SMART is contrary to Patent Owner's argument and satisfies claim 49.

We also note Dr. Jacobs testifies that Fox SMART only teaches counting indirect relationships, and quotes the reference as stating that "[f]orming the bc submatrix requires a bit more processing. . . . result is also sorted and duplicates are counted." Ex. 2113 ¶ 274 (quoting Ex. 1208, 30). The ellipsis in Dr. Jacobs's quotation, however, omits a sentence that directly contradicts Patent Owner's contention: "Cited tuples are sorted on the second attribute and then coupled articles are identified." Ex. 1208, 30. The CITED tuples of Fox SMART are the direct links, not the indirect relationships Patent Owner and Dr. Jacobs contend. Because of omission, Dr. Jacobs's testimony on this issue lacks credibility.

For the foregoing reasons, Petitioner has shown by a preponderance of the evidence that claims 19, 20, 48, and 49 of the '494 patent are unpatentable under 35 U.S.C. § 103(a) as they would have been obvious over Fox Thesis, Fox SMART, and Fox Collection.

6. Combinations With Other References

In addition to the obviousness ground based solely on the Fox Papers, we instituted trial on two related grounds alleging obviousness of various

dependent claims over the Fox Papers in combination with other secondary references. Inst. Dec. 19–23 (claims 45 and 51 over Fox Papers, Saito Clustering, and Fox Envision; claim 54 over Fox Papers, Saito Clustering, Fox Envision, and Little). As set forth below, Petitioner has established by a preponderance of the evidence that claims 45, 51, and 54 are unpatentable.

a. Claim 45

We find that Petitioner has established by a preponderance of the evidence that claim 45 would have been obvious over the combined disclosures of the Fox Papers, Fox Envision, and Saito Clustering. Claim 45 depends from claim 19, and further requires, *inter alia*, that "the direct relationships are hyperlink relationships between objects on the world wide web" and "analyzing direct link weights in a set of paths." Petitioner contends that the former limitation is taught by Fox Envision, whereas the latter is taught by Fox Thesis, Fox SMART, or Saito Clustering. Pet. 54–55.

Petitioner asserts that Fox Envision "suggests the extension of [information retrieval] techniques to the Web," and that a person of ordinary skill in the art would have combined Fox Envision with the Fox Papers because Envision is follow-on work to Dr. Fox's original thesis. Pet. 53–54.

Petitioner characterizes Saito Clustering as "applying a weighting factor to each link in [a path of links] that diminishes as the number of links increases." *Id*. Saito Clustering's "total citation relation matrix" includes a weight w_k that reduces for each additional link in a path. *Id*. Petitioner provides no testimony from Dr. Fox regarding the disclosure of Saito Clustering.

Patent Owner contends that Saito Clustering fails to disclose the analyzing direct link weights element of claim 45, and thus the combination

of Saito Clustering with the Fox Papers and Fox Envision fails to render claim 45 obvious. PO Resp. 44–46. Patent Owner argues that the weight w_k in Saito Clustering is applied to a "walk," meaning the entire path between two nodes, as opposed to the individual links of the path. *Id*. Dr. Jacobs adds that a person of ordinary skill in the art would have understood that "a directed walk is not a link, but rather corresponds to a path." Ex. 2113 ¶ 399.

We agree with Patent Owner that Saito Clustering's weights are applied to a path, not the direct links therein, and thus do not meet claim 45's limitation. However, Patent Owner fails to address the disclosures of Fox Thesis and Fox SMART, which are also cited by Petitioner. One cannot show non-obviousness by attacking references individually where the challenge is based on a combination of references. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986); *In re Keller*, 642 F.2d 413, 426 (CCPA 1981).

Dr. Fox testifies that Fox Thesis discloses that "[t]he bc and cc subvectors are generated based on an analysis of direct links, and are weighted according to the count of the coupling and co-citation relationships established by those direct links." Ex. 1218 ¶ 209. In other words, the weighting of the paths *bc* and *cc* in Fox Thesis are generated using a count of the direct links, which are each weighted as 1. Ex. 1209, 171–72, Figs. 6.3, 6.4. Patent Owner provides no reason why a weight of 1 for each direct link is insufficient to meet the limitation of a "direct link weight," and we discern no disclosure in the specification of the '494 patent that would require a narrower interpretation.

Patent Owner contends that the Petition does not establish that "analyzing web-based links would have been obvious to one of ordinary skill in 1996; they are obvious only in hindsight." PO Resp. 46. Dr. Jacobs acknowledges that "the Web was known before 1996, and hypertext had been known long before the Web," but argues that "[w]hile it may have been obvious to combine some information retrieval methods with the Web in 1996 . . . the inventive step of the '494 patent of treating Web links as citations was by all indications non-obvious." Ex. 2113 ¶ 403.

Fox Envision, however, teaches applying citation analysis to hypertext systems, including the World Wide Web:

> We are beginning to see the emergence of *wide area hypertext systems* (Yankelovich, 1990) *like the WorldWideWeb (WWW)*, that carry this concept forward into a distributed environment. Clearly, *we must coordinate hypertext and hypermedia linking with the various approaches to search and retrieval* (Fox et al., 1991b). *One approach* is the idea of information graphs (including hypergraphs), where *objects of all types are interrelated by links or arcs that capture not only citation (reference)* but also inheritance, inclusion, association, synchronization, sequencing, *and other relationships*.

Ex. 1210, 482 (emphases added).

Patent Owner argues that the above-referenced excerpt of Fox Envision is not sufficient because "[n]owhere is there any suggestion that hyperlinks should be treated as citations for purposes of citation analysis." PO Resp. 18. Dr. Jacobs makes the same claim. Ex. 2113 ¶ 393. Patent Owner and Dr. Jacobs's statements are inaccurate representations of the reference. The approach taught in Fox Envision interrelates "objects of all types," including objects on the World Wide Web, so as to capture citation relationships (Ex. 1210, 482).

b. Claim 51

We find that Petitioner has established by a preponderance of the evidence that claim 51 would have been obvious over the combined disclosures of the Fox Papers, Fox Envision, and Saito Clustering. Claim 51 depends from claim 48—which we have found to have been obvious over the Fox Papers—and further requires that the identified objects include web sites, and the identifying step includes providing a Universal Resource Locator that identifies a web page. Patent Owner does not address any particular limitation of claim 51, but rather repeats its argument that analyzing web-based links would not have been obvious to one of ordinary skill. PO Resp. 46. We find this argument unpersuasive for the reasons discussed above.

c. Claim 54

Claim 54 depends from claim 45, which we have found would have been obvious for the reasons discussed above. The additional limitation of claim 54 recites that "an independent application determines a cost associated with accessing the identified objects." Petitioner contends that claim 54 would have been obvious over an eight-reference[4] combination of Fox Thesis, Fox SMART, Fox Collection, Fox Envision, Saito Clustering, Saito Design,[5] Fox Hypertext,[6] and Little. Pet. 56. The Petition primarily

[4] Because the Petition set forth the ground of unpatentability of claim 54 as being based on the combination of all eight references, we repeat them here. Pet. 56. However, we do not rely on all references in the ground to find that all elements of the claims are taught or suggested by the prior art.
[5] Tatsuki Saito, *Design and Implementation for Scientific Article Data Base*, Bulletin of the Faculty of Eng'g, Hokkaido Univ. no. 151 pp. 19–34 (July 30, 1990) ("Saito Design") (Ex. 1213).

relies on Little, which discloses methods for billing users of a website according to the amount of information accessed or the amount of detail extracted (Ex. 1216, 77), to teach the additional limitation of claim 54. Petitioner further contends that it would have been obvious to use a program separate from the content database to determine the cost for accessing the information in the database, because Little recites advantages for doing so. Pet. 56–57.

Patent Owner does not argue the patentability of claim 54 separately or address the disclosure of Little. Upon review of the Petition and supporting evidence, we conclude that Petitioner has shown by a preponderance of the evidence that claim 54 would have been obvious over the combination of Fox Thesis, Fox SMART, Fox Collection, Fox Envision, Saito Clustering, and Little.

C. Obviousness of Claims 18–20, 48, and 49 Over the Tapper Papers

We instituted trial to determine whether claims 18–20, 48, and 49 are unpatentable under 35 U.S.C. § 103 as having been obvious over the combined disclosures of Tapper 1976 and Tapper 1982 (collectively, "the Tapper Papers"). Inst. Dec. 16–19.

We have considered Petitioner's arguments and evidence, as well as the counter-arguments in Patent Owner's Response, and the evidence cited therein, and conclude that Petitioner has not shown by a preponderance of the evidence that claims 18–20, 48, and 49 of the '494 patent are

[6] Edward A. Fox, et al., *Integrating Search and Retrieval with Hypertext*, HYPERTEXT/ HYPERMEDIA HANDBOOK, 329–355 (1991) ("Fox Hypertext") (Ex. 1211).

unpatentable, under 35 U.S.C. § 103, as having been obvious over the Tapper Papers.

1. Tapper 1976

Tapper 1976 discloses a "citation vector technique" for retrieving legal information that seeks to overcome perceived deficiencies in Boolean search strings. Ex. 1204, 270–71. Rather than characterizing a legal document by the words it contains, vector matching focuses on the citations the document contains. *Id*. at 263. Tapper 1976 also notes that the technique may be used as an adjunct to a full-text retrieval system. *Id.* at 272.

By repeating the vector characterization of the documents, Tapper 1976 discloses that a matrix may be created that shows the similarities between the documents. *Id.* By re-ordering the matrix, the documents may be clustered according to their similarity. *Id.* The reference also discloses that "second generation citations" may be used: "if a case cites cases A', B' and C', and case A' cites a1', a2' and a3', case B' b1', b2' and b3' and case C' c1', c2' and c3' the original case would be represented by a combination of its own vector, and those of cases A', B' and C'." *Id.* at 266.

2. Tapper 1982

Tapper 1982 similarly focuses on the drawbacks of full-text searching of legal documents and the alternative use of citation vectors for legal research. Ex. 1205, 135–36. The reference discusses weighting certain citation vectors more heavily than others, for example by the difference in the ages of the citing and cited case. *Id.* at 138.

A pilot project implementing such a citation vector-based system is also described by Tapper 1982. *Id.* at 139. The reference discloses a

correlation algorithm used in the pilot project to cluster together vectors with a high degree of association. *Id.* at 143–44. Such clustering is said to permit a document to be retrieved "not only because it is itself closely associated with another target document, but also because both it and the target document are closely associated with a third." *Id.*

3. Claim 18

As discussed above, the preamble of claim 18 requires that the database have "a first numerical representation of direct relationships in the database." We find that this limitation is neither taught nor suggested by the combined Tapper Papers.

Petitioner's claim chart does not identify a first numerical representation, instead merely identifying where the Tapper papers disclose direct relationships. Pet 27. For example, Tapper 1976 is cited as disclosing "algorithms that identify citations in full-text automatically" (Ex. 1204, 260) and "[c]haracterizing a legal document not by the words, but by the citations it contains." *Id*. at 262. Tapper 1982 is cited as disclosing "the use of case citations as selection vectors in legal information retrieval." Ex. 1205, Abstract. These portions of Tapper, however, merely discuss the use of case citations (direct relationships) as the basis for non-semantical search. Petitioner provides no citation to a disclosure by the Tapper Papers that these direct relationships are represented by a first numerical representation.

The narrative portion of the Petition accompanying the claim chart pertaining to the Tapper Papers does not address first numerical representation, or specify how the second numerical representation is created. Pet. 26–27, 36–37.

In its Reply Brief, Petitioner identifies two other disclosures by the Tapper Papers it contends satisfy the first numerical representation limitation. First, Petitioner argues that "the legal citations in Tapper clearly qualify as numerical representations." Reply 11. The legal citations Petitioner identifies, however, are in the exemplary form of "500 F.2d 411," which includes letters. As we have construed the term, this is not a numerical representation.

Second, Petitioner notes that the Tapper Papers describe assigning cases in the database a unique ID number. *Id*. (citing Ex. 1205, 148). At oral argument, Petitioner's counsel directed our attention to Table 2 of Tapper 1982, which includes in the leftmost column pairs of numbers which signify pairs of documents. Tr. 16; Ex. 1205, 147. The document numbers indicated by Petitioner are numerical representations of *documents*,[7] not the *relationships* between those documents. Claim 18 requires that the first numerical representations are of direct relationships in the database. Numerical representations of documents, not the relationships between them, cannot satisfy this limitation.

Nor can the document number *pairs* be a first numerical representation, as Tapper 1982 does not disclose that the pairs represent a direct relationship (i.e., one of the documents in the pair citing the second). Rather, the pairs of documents appear to be listed together in the table because of their high "correlation values." Ex. 1205, 148. As Petitioner acknowledges, these correlation values represent indirect relationships between the documents (Reply 12 ("correlation values of cases' indirect

[7] "The first column gives the numbers allocated to the cases." Ex. 1205, 148.

relationships")), therefore they cannot be a first numerical representation of a direct relationship.

Petitioner argues in the alternative that "there is nothing non-obvious about creating citation vectors consisting solely of numbers." Reply 11. At the outset, we note that this argument was presented for the first time in the Reply; the sole modification to the Tapper Papers addressed in the Petition is the combination of the disclosures of the two references. Pet. 36–37. Nor did Petitioner present any testimony with the Petition regarding the Tapper Papers, or how a person of ordinary skill in the art would have modified the references. It would be a proper exercise of our discretion, therefore, to not consider this argument and the Reply Declaration of Dr. Fox (Ex. 1233), which presents testimony on the Tapper Papers for the first time.[8] *See* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,767 (Aug. 14, 2012) ("a reply that raises a new issue or belatedly presents evidence will not be considered.")

Even if we were to consider Petitioner's Reply and Dr. Fox's Reply Declaration, however, we are not persuaded. Petitioner cites to various portions of the Tapper Papers (Reply 11), but none of these citations sufficiently establish a reason to substitute numerical representations for those disclosed in Tapper. For example, Petitioner argues—using pieced-together quotations—that "Tapper [1982] also makes clear that one could 'very easily' use a 'simple conversion table' to map 'extracted' citations to any 'chosen style.'" *Id*. (citing Ex. 1205, 136). Upon reading the full context from which these quotes are drawn, however, it is clear that Tapper

[8] We address Patent Owner's Motion to Exclude portions of the Reply Declaration below.

1982 is discussing "parallel reports of the same decision." Ex. 1205, 136. In other words, Tapper 1982 does not contemplate converting letter-containing case citations into numbers, but rather converting one letter-containing citation into another.

Dr. Fox's Reply Declaration (Ex. 1218 ¶¶ 107–115) relies on the same arguments as Petitioner's Reply, and we find them unpersuasive for the same reasons. Nor are we persuaded by the portions of Dr. Jacobs's cross-examination Petitioner cites (Reply 11 (citing Ex. 1235, 313:7–316:23, 339:3–342:6)), as Dr. Jacobs's testimony was to what a person of ordinary skill would have understood from the '494 patent specification, not the Tapper Papers. *See In re Vaeck*, 947 F.2d 488, 493 (Fed. Cir. 1991) (suggestion to make invention cannot "be founded . . . in the applicant's disclosure"). The record before us does not support the conclusion that a person of ordinary skill in the art would have modified the combined disclosures of the Tapper Papers to include a first numerical representation.

4. Dependent Claims

The remaining instituted claims all depend, directly or indirectly, from claim 18, and thus incorporate claim 18's requirement of a first numerical representation. We, therefore, find that the Tapper Papers do not teach or suggest all elements of these dependent claims.

D. Motion to Exclude

Patent Owner filed a Motion to Exclude (Paper 44) in which Patent Owner seeks to exclude portions of the Reply Declaration of Dr. Edward A. Fox (Ex. 1233) ("Reply Declaration") submitted with Petitioner's Reply. In particular, Patent Owner identifies three issues with the Declaration, each of

which is based on the argument that portions of the Declaration are improper reply evidence.

In its Reply, a Petitioner may only respond to arguments raised in the Patent Owner's Response. 37 C.F.R. § 42.23(a). "A reply that raises a new issue or belatedly presents evidence will not be considered." Office Patent Trial Practice Guide, 77 Fed. Reg. at 48,767. The Practice Guide provides, as indications of improper reply evidence, "new evidence necessary to make out a *prima facie* case for . . . patentability or unpatentability . . ., and new evidence that could have been presented in a prior filing." *Id*.

A motion to exclude evidence under 37 C.F.R. § 42.64(c), however, "normally is not the proper vehicle for resolution of a dispute regarding reply arguments and evidence exceeding the proper scope of a reply." *ABB, Inc. v. Roy-G-Biv Corp*., Case IPR2013-00063, slip op. 13–14 (PTAB May 16, 2014) (Paper 71); *Corning Inc. v. DSM IP Assets B.V.*, Case IPR2013-00047, slip op 7 n.3 (PTAB May 1, 2014) (Paper 84) (characterizing such motions as "now disfavored"). Rather, when evaluating the record after oral argument, the Board is capable of determining what, if any, evidence exceeds the proper scope of rely, and accordingly disregarding that evidence.

While we, therefore, *deny* Patent Owner's Motion, we also note that even if it were proper, we would dismiss it as moot. With respect to the objected-to portions of the Reply Declaration which discuss the Tapper Papers, we have considered them above, found Dr. Fox's testimony unpersuasive, and found in favor of Patent Owner on the Tapper Papers ground. With respect to the Fox Papers grounds, we have found in favor of Petitioner, but did not rely on any of the objected-to portions of the Reply

Declaration in so doing. A decision to exclude the Reply Declaration would, therefore, not affect our determinations in this case.

E. Motions to Seal

Patent Owner filed a Motion to Seal (Paper 32) the Declaration of Dr. Amy N. Langville ("Langville Declaration") filed as Exhibit 2114. Petitioner filed a Motion to Seal (Paper 39) the Transcript of the Deposition of Amy N. Langville, Ph.D. ("Langville Transcript") filed as Exhibit 1236. Both of these motions are unopposed.

Regarding Patent Owner's Motion to Seal, according to Patent Owner paragraphs 25, 112, and 113 of the Langville Declaration make reference to certain facts about confidential licenses to the patents under review. Paper 32, 3. Additionally, Patent Owner contends that this information has not been made, and will not be made, public. *Id*.

Regarding Petitioner's Motion to Seal, according to Petitioner, Patent Owner has designated the transcript as confidential. Paper 39, 3. To avoid public disclosure, therefore, Petitioner submits sealing the Langville Transcript is appropriate. *Id*.

There is a strong public policy in favor of making information filed in *inter partes* review proceedings open to the public. *See Garmin Int'l v. Cuozzo Speed Techs., LLC*, Case IPR2012-00001 (PTAB Mar. 14, 2013) (Paper 34). Under 35 U.S.C. § 316(a)(1), the default rule is that all papers filed in an *inter partes* review are open and available for access by the public.[9] The standard for granting a motion to seal is "good cause."

[9] Additionally, we note that confidential information subject to a protective order ordinarily would become public 45 days after final judgment in a trial. Office Patent Trial Practice Guide, 77 Fed. Reg. at 48,761. However, after

37 C.F.R. § 42.54. A moving party bears the burden of showing that the relief requested should be granted. 37 C.F.R. § 42.20(c).

Regarding Patent Owner's Motion to Seal, Patent Owner, as the moving party, has failed to carry its burden. Patent Owner identifies only three paragraphs in the Langville Declaration that purportedly contain confidential information. However, Patent Owner has not pointed to proof in the record that any information contained in these paragraphs is confidential. Additionally, although Patent Owner contends that this information has not been made, and will not be made, public, Patent Owner presented this information during the hearing on October 30, 2014, which was open to the public. *See* Tr. 54:12–25. We, therefore, determine that Patent Owner has not met its burden of proof.

Regarding Petitioner's Motion to Seal, Patent Owner's designation of the transcript as confidential is not sufficient to show that the transcript contains confidential information. We, therefore, determine that Petitioner has not met its burden of proof.

We recognize a denial of the motions to seal would immediately unseal the material that Patent Owner desires to remain confidential and the effect would be irreversible. Therefore, rather than denying the motions at this time, we will provide Patent Owner and Petitioner one week to (1) withdraw the motions to seal and request that we expunge Exhibits 2114 and 1236, or (2) withdraw the motions to seal, request that we expunge Exhibits 2114 and 1236, and replace them with redacted versions that leave out the confidential information. We note that we have not relied on the

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denial of a petition to institute a trial or after final judgment in a trial, a party may file a motion to expunge confidential information from the record. 37 C.F.R. § 42.56.

three paragraphs of the Langville Declaration that Patent Owner identifies as containing allegedly confidential information.

III. CONCLUSION

We conclude that Petitioner has shown by a preponderance of the evidence that claims 18–20, 45, 48, 49, 51, and 54 of the '494 patent are unpatentable under 35 U.S.C. § 103.

IV. ORDER

For the reasons given, it is

ORDERED that claims 18–20, 45, 48, 49, 51, and 54 of U.S. Patent No. 5,544,494 are determined by a preponderance of the evidence to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude the Reply Declaration of Dr. Edward A. Fox (Exhibit 1233) is denied;

FURTHER ORDERED that Exhibit 2114 and Exhibit 1236 will be made available to the public after 5 PM Eastern five business days after the entry date of this decision, unless prior to that time, each of Patent Owner and Petitioner (1) withdraws the motions to seal and requests that we expunge Exhibits 2114 and 1236, or (2) withdraws the motions to seal, requests that we expunge Exhibits 2114 and 1236, and replaces them with redacted versions that leave out the confidential information; and

FURTHER ORDERED that, because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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