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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ALEXANDER JOHNSTON LAWSON, STEFAN ROLLER, HELMUT GROTZ, JANUSZ L. WISNIEWSKI, and LIBUSE GOEBELS

Appeal 2017-004059
Application 13/075,350
Technology Center 1600

Before ERIC B. GRIMES, DEBORAH KATZ, and JOHN G. NEW, *Administrative Patent Judges*.

KATZ, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants[1] seek our review, under 35 U.S.C. § 134(a), of the Examiner's decision to reject claims 24, 27, 28, 30–33 and 36–48, the only pending claims in their application. (App. Br. 1.) We have jurisdiction under 35 U.S.C. § 6(b). We AFFIRM.

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[1] Appellants report that Elsevier Information Systems GmbH is the real party in interest. (App. Br. 2.)

Appellants claim methods of using a computer for detecting chemical names and reactions in a text document and, after determining the role of each, determining a chemical structure by generating "electronic connection table files" as recited in claim 24. (*See* Spec. 8:3–6.) "Connection tables" are described as chemical structures in vector graphic form. (*See* Spec. 8.)

Appellants' claim 24, the only independent claim on appeal, recites:

> A computer implemented method for processing text documents and extracting chemical data therein, comprising:
>
> detecting, by one or more data processors, one or more chemical names present within a text document;
>
> detecting, by one or more data processors, one or more chemical reactions present in a text document;
>
> determining, by one or more data processors, parts of speech for each word in the one or more chemical reactions;
>
> determining, by one or more data processors, chemical role for at least one of the one or more chemical names in the text document by comparing the patterns of at least two of: the words in the detected reaction, determined parts of speech and detected chemical names to at least one predefined pattern stored in memory,
>
> wherein the predefined pattern comprises at least two of: words, parts of speech and chemical name location;
>
> storing the chemical reactions and chemical roles in one or more computer readable storage mediums;
>
> determining, by one or more data processors, one or more chemical structures for the detected one or more chemical names;
>
> generating, by one or more processors, one or more electronic connection table files representing the chemical structure for the one or more chemical names; and
>
> storing the one or more electronic connection table files in one or more computer readable storage mediums.

(App. Br. 35–36, Claims App'x.)

The Examiner rejected all of Appellants' pending claims as being drawn to ineligible subject matter under 35 U.S.C. § 101. (*See* Final Office Action mailed October 29, 2015 ("Final Act."), at 2–3.)

The Examiner also rejected claims 24, 27, 28, 30–33, 36–40, 44, and 48 as being obvious over Zamora[2], Murray-Rust[3], and Vander Stouw[4] (*see id.* at 6–9) and dependent claims 41–43 as being obvious over Zamora, Murray-Rust, Vander Stouw, and Castano[5] (*see id.* at 9–10) both under 35 U.S.C. § 103(a).

The Examiner withdrew a rejection of dependent claims 45–47 over Zamora, Murray-Rust, and Vander Stouw under 35 U.S.C. § 103(a) in light of Appellants' arguments. (*See* Ans. 2.)

In addition, the Examiner rejected Appellants' claims 24, 26–28, 30–33, and 36–48 under the doctrine of obviousness-type double-patenting over claims 1, 3, 6, 7, 10, and 12 of patent 7,933,763. (Final Act. 10–11.) Appellants note in the Reply Brief that they have submitted a Terminal Disclaimer to address this rejection. (*See* Reply Br., 16.) In the absence of arguments against the rejection, we affirm it. In the event of continued

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[2] Zamora and Blower, Jr., "Extraction of Chemical Reaction Information from Primary Journal Text Using Computational Linguistics Techniques. 2. Semantic Phase," 24 J. CHEM. INF. COMPUT. SCI. 181–88 (1984).
[3] Murray-Rust, et al., "Development of chemical markup language (CML) as a system for handling complex chemical content," 25 NEW J. CHEM. 618–34 (2001).
[4] Vander Stouw et al., "Automated Conversion of Chemical Substance Names to Atom-Bond Connection Tables," 14 J. CHEM. DOCUMENTATION 185–93 (1974).
[5] Castano et al., "Anaphora Resolution in Biomedical Literature," Proceedings of the International Symposium on Reference Resolution for NLP, pp. 1–9 (2002).

prosecution of the application, the Terminal Disclaimer may be considered.

35 U.S.C. § 101

Claim 24

The Examiner rejected Appellants' claims as being drawn to nonstatutory subject matter. (Final Act. 2–3.) Although 35 U.S.C. § 101 provides that "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor . . . ," the Supreme Court has determined that there are exceptions to what is patentable. Specifically, "laws of nature, natural phenomena, and abstract ideas" are not eligible subject matter. *See Diamond v. Diehr*, 450 U.S. 175, 185 (1981).

To determine if claimed subject matter is statutorily eligible in light of these judicial exceptions, we follow the two-step framework specified in *Mayo Collaborative Services v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012). As later articulated:

> First, we determine whether the claims at issue are directed to one of those patent-ineligible concepts. . . . If so, we then ask, "[w]hat else is there in the claims before us?" . . . To answer that question, we consider the elements of each claim both individually and "as an ordered combination" to determine whether the additional elements "transform the nature of the claim" into a patent-eligible application.

Alice Corp. Pty. v. CLS Bank Int'l, 134 S. Ct. 2347, 2355 (2014) (quoting *Mayo*, 566 U.S. at 78.

Claim 24 recites a computer-implemented method for extracting chemical data from text documents and generating connection table files representing chemical structures from the data. (*See* Final Act. 2.)

According to the Examiner, detecting chemical names, reactions, and parts of speech; determining a chemical role for a chemical name; storing chemical reactions and roles; determining chemical structures; and generating and storing electronic connection table files, as recited in the claims, are abstract ideas. (*See* Final Act. 2–3.) The Examiner finds that these steps are mathematical/algorithmic concepts involving the manipulation of data and, thus, are directed to a judicial exception to patentable subject matter. (*See* Ans. 3.)

Having determined that the claimed methods satisfy the first step of the *Mayo* framework, the Examiner finds that claim 24 does not include additional elements besides the abstract ideas of the method steps. (*See* Final Act. 3.) The Examiner finds that storing chemical reactions, roles, and connection tables is "nothing more [than] routine data collection and/or insignificant extrasolution activity and/or generic computer functions performing well-understood, routine, and conventional activities previously known to the industry." (*See id.*) The Examiner also finds that the "processor" recited in claim 24 is generic and that a general purpose computer can perform the basic mathematical calculation functions required. (*Id.*) Thus, according to the Examiner, claim 24 is unpatentable under 35 U.S.C. § 101.

Appellants dispute the Examiner's findings, first arguing that claim 24 is not directed to an abstract idea. (*See* App. Br. 12–15.) According to Appellants, because the claimed method is not directed to a fundamental economic practice, a method of organizing human activities, an idea of itself, or a mathematical relationship/formula, it is directed to patent eligible subject matter. (*See* App. Br. 12–13 and 15.) As Appellants acknowledge,

these categories are merely examples of abstract ideas and are not an exclusive listing of ineligible subject matter. (*See* 2014 Interim Guidance, 79 Fed. Reg. 74618, 74622 ("Abstract ideas have been identified by the courts *by way of example*, including fundamental economic practices, certain methods of organizing human activities, an idea 'of itself,' and mathematical relationships/formulas." (emphasis added); *see* App. Br. 12; *see* Ans. 4.) Thus, this argument is unpersuasive.

Appellants argue further that claim 24 recites a concrete and specific method "necessarily rooted in computer technology that is used to solve the computer-centric technical problem of automated extraction of chemical data . . . ." (App. Br. 14.) According to Appellants, the transformation or reduction of a particular article (a chemical name within the text of a document), into a physically stored state or thing (electronic connection table files) is not abstract. (*See* App. Br. 14.)

This argument is also unpersuasive. Contrary to Appellants' characterization, a chemical name is not a physical thing. The ink on the page may be physical, but the name is an abstract concept representing a physical structure. Similarly, an electronic connection table file represents a physical structure, but is not the physical structure. (*See, e.g.*, claim 24 ("one or more electronic connection table files *representing* the chemical structure" (emphasis added)).) Although electronic connection table files may be physically stored, Appellants' claims are not directed to the physical means of storing on a computer, but to a method that uses these files. Thus, we are not persuaded that Appellants' claim 24 involves the transformation of an abstract idea to make it patentable.

Appellants' argument that claim 24 is "necessarily rooted in computer technology" is similarly unpersuasive. (*See, e.g.*, App. Br. 13 and 14, Reply Br. 7–8.) Appellants' Specification explains that "[t]he human mental process for arriving at the structure from a chemical name appears to be a rule-based linguistic approach." (Spec. 1:13–14.) Thus, the solution to the problem posed by Appellants' claims could be accomplished by a human, absent the recited limitations to using a data processor or computer.

Appellants cite to *DDR Holdings, LLC v. Hotels.com*, 773 F.3d 1245 (Fed. Cir. 2014), in support of their argument. (*See* App. Br. 14 and 16–17.) But the claims in *DDR* are not similar to claim 24. The claims in *DDR* were directed to overcoming "a problem specifically arising in the realm of computer networks" – the problem of retaining website visitors, who could be otherwise instantly transported away from a host's website after "clicking on" and activating a hyperlink. *DDR*, 773 F.3d at 1257. Thus, the problem in *DDR* would not exist without computer technology such as the internet and hyperlinks. In contrast, none of the steps recited in claim 24 necessarily requires a computer, except for the recitations of using a generic data processor or storing information in a computer readable storage medium. We are not persuaded that the method of claim 24 is "computer-centric" or "necessarily rooted in computer technology" as Appellants argue. (*See* App. Br. 15.)

Appellants also argue that the ability to run a method on a computer does not automatically doom claim 24, citing *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016). (*See* Reply Br. 2–3.) Because computers are invoked merely as a tool in claim 24, their inclusion does not indicate patentability. In *Enfish*, the court was "not faced with a situation

where general-purpose computer components are added post-hoc to a fundamental economic practice or mathematical equation[, but r]ather, the claims [were] directed to a specific implementation of a solution to a problem in the software arts," 822 F.3d at 1339. In claim 24 the recitation of a data processor and computer readable storage mediums are general purpose elements added to a method that could otherwise be done without them. Instructions to do the method on a computer do not make an otherwise unpatentable method patentable. *See Alice Corp. Pty. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2358 (2014) ("These cases demonstrate that the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention. Stating an abstract idea 'while adding the words 'apply it' is not enough for patent eligibility.").

We consider *Content Extraction and Transmission LLC v. Wells Fargo Bank, National Ass'n*, 776 F.3d 1343 (Fed. Cir. 2014), to be more instructive. In that case, claims to methods of extracting data from hard copy documents using an automated scanner, recognizing specific information in the extracted data, and storing the information in memory were found to be ineligible under 35 U.S.C. § 101. (*See id.* at 1345.) The Federal Circuit determined that because humans could perform the functions of collecting, recognizing, and storing data the claims were abstract. (*See id.* at 1347.) Although Appellants' claim 24 includes the steps of determining a chemical structure and generating an electronic connection table in addition to recognizing, extracting, and storing data, it is also drawn to an abstract idea that can be done by humans. Accordingly, we are not persuaded that the Examiner erred in determining claim 24 is directed to an abstract idea.

Appellants argue further that, in the event of this determination, claim 24 is still directed to eligible subject matter because it recites significantly more than the abstract idea. (*See* App. Br. 15–20.) According to Appellants, claim 24 is similar to the claim of Example 3 of the *USPTO 2014 Interim Guidance of Patent Subject Matter Eligibility and Examples: Abstract Ideas* published on January 27, 2015 ("Examples"). (*See* App. Br. 17–18.) In Example 3 a claim to a method of halftoning a gray scale image is patent eligible despite reliance on an iterative mathematical operation because the mathematical operation is tied to processing digital images. (*See* Examples at 9.) According to the Examples, "the claim goes beyond the mere concept of simply retrieving and combining data using a computer." (*Id.*) Appellants argue that their claimed method recites the "concrete and specific" steps of determining a chemical structure for a chemical name and generating an electronic connection table file representing the chemical structure, which is significantly more than mere computer implementation of an abstract idea. (*See* App. Br. 18.)

We disagree with Appellants because, as explained above, determining a chemical structure for a chemical name could be accomplished by a "human mental process," (*see* Spec. 1:13–14) and generating electronic connection table files was a well-known data collection activity that could be done on a generic computer (*see* Spec. 4–5 (discussing connection tables and stating that "[c]onversions of the sort outlined above have a long tradition.")). Thus, we agree with the Examiner that there is nothing added to Appellants' recited steps that was not a well-understood, routine, and conventional activity in the industry. (*See* Ans. 5.) Inclusion of the words "by one or more data processors" and steps for storing

information in "computer readable storage mediums," as recited in claim 24, does not transform the steps of retrieving, combining, and storing data into eligible subject matter.

We are also not persuaded by Appellants' argument that claim 24 is directed to improvements in the field of computer implemented textual analysis (computational linguistics) because it is directed to automatically extracting chemical information from a document. (*See* App. Br. 18–19; Reply Br. 6.) Although claim 24 recites using a computer, the steps are known and routine ways that computers were used previously in the field. Thus, even if the method of claim 24 is an improvement in the analysis of chemical text documents we do not find that claim 24 recites an improvement in the general field of computational linguistics.

Accordingly, we are not persuaded that the Examiner erred in determining that claim 24 fails to recite significantly more than an abstract idea and is unpatentable under 35 U.S.C. § 101.

Dependent Claims

Appellants argue that the Examiner failed to analyze Appellants' dependent claims and that the additionally recited limitations provide significantly more than the abstract idea. (*See* App. Br. 19–20.) For example, claim 45 recites:

> The method of claim 24 wherein the step of determining the chemical structure for the detected one or more chemical names comprises:
>
> creating one or more pre-processed chemical names by adjusting the one or more chemical names to comply with one or more pre-defined standards;
>
> parsing the one or more pre-preprocessed chemical names into a plurality of fragments;

> classifying individual fragments of the plurality of fragment of the one or more preprocessed chemical names as recognizable fragments and assigning a class unit to each recognizable fragment;
>
> for each of the one or more chemical names, ordering the recognizable fragments into a tree structure based at least on class units; and
>
> for each of the one or more chemical names, generating the electronic connection table representing the chemical structure from the tree structure.

(App. Br. 39, Claims App'x.) Claim 45 includes steps for determining a chemical structure that further characterize and manipulate a chemical name. (*See* App. Br. 19; *see* Reply Br. 7 and 13–16.) We agree with the Examiner that these steps describe abstract ideas because, like the steps of claim 24, they are directed to altering a chemical name. (*See* Ans. 7.) Although Appellants argue that "claims are not doomed merely because they recite mathematically manipulating data" (Reply Br. 13–14), Appellants do not argue or direct us to evidence showing that the activities recited are more than mathematical manipulations of the data representing chemical names.

Accordingly, Appellants do not persuade us that claims 27, 28, 30–33, and 36–48 are directed to patent eligible subject matter.

35 U.S.C. § 103

The Examiner rejected claim 24 and dependent claims 27, 28, 30–33, 36–40, 44, and 48 as being obvious under 35 U.S.C. § 103(a) over Zamora, Murray-Rust, and Vander Stouw. (*See* Final Act. 6–10.) Zamora teaches processing text documents, extracting chemical reaction data, and storing the

information. (Final Act. 7, citing Zamora 182–183 and 186.) Zamora explains that

> [t]he goal of the research described here is to investigate the applicability of computational linguistic techniques to the problem of extracting facts about chemical reactions from the text of primary journals of the American Chemical Society (ACS) and encoding those facts in a form suitable for establishing a reaction database.

Zamora 181. Specifically, Zamora teaches identifying chemical names from headings provided in the text and chemical reactions from the "workups" described in the text. (*See* Zamora 182–83; *see* Final Act. 7.) Zamora also teaches that products and reactants can be determined by a procedure wherein verbs and parts of speech are mapped with other words and names. (*See* Zamora 183–84.) We agree with the Examiner that Zamora teaches Appellants' claimed steps of determining chemical roles for chemical names in a specified text by comparing patterns of words, parts of speech, or chemical names. (*See* Final Act. 7.)

Zamora also teaches mapping specific nouns and verbs with their corresponding semantic entities to determine chemical roles and storing this information. (*See id.*, citing Zamora 185–186.) We agree with the Examiner that this is a teaching of the determining and storing chemical roles recited in Appellants' claims. (*See* Final Act. 7.) Zamora teaches that these steps can be performed by a program executed on a computer. (*See* Final Act. 7–8; *see, e.g.*, Zamora 181.)

The Examiner finds that Zamora does not explicitly teach determining a chemical structure for the detected names and generating and storing

electronic connection table files representing the chemical structures, as recited in claim 24. (*See* Final Act. 8.)

Vander Stouw teaches that as long ago as 1974 those in the art used computer programs for converting names of chemical compounds into "atom-based connection tables" to be used in the CAS Chemical Registry System, which links names and structural representations of a substance. (Vander Stouw abstract and 185.) Thus, we agree with the Examiner that Vander Stouw teaches determining chemical structures based on chemical nomenclature. (*See* Final Act. 8, citing Vander Stouw 188–90 and Figs. 4–5.)

In addition, the Examiner cites to Murray-Rust for teaching that computation methods were known for automatically determining a chemical structure based on chemical information from a database and displaying this chemical structure on a computer. (*See* Murray-Rust 625–28, Figs. 10–12; Final Act. 8.) Murray-Rust reports a fully operational system for managing complex chemical content in XML-based markup languages using chemical markup language (CML 1.0), which displays molecules within a standard web browser. (*See* Murray-Rust abstract.)

According to the Examiner, it would have been obvious to one of ordinary skill in the art to combine the teachings of Zamora, Murray-Rust, and Vander Stouw to provide more robust tools and databases for automated management of complex chemical content. (*See* Final Act. 8.) The Examiner also finds that there would have been a reasonable expectation of success in doing so because Zamora suggests combining information about stoichiometry and chemical structure into the chemical reaction models taught. (*See* Final Act. 8, citing Zamora 188 ("By incorporating a model of

a chemical reaction in the program (or by applying it to the RIF generated), many inconsistencies could be resolved. This would involve adding to the program knowledge about stoichiometry, mass balance, and chemical structure rearrangements, the uses of common chemicals in the laboratory, and some general concepts of chemistry.").)

Appellants argue that the combination of references does not teach or suggest "determining, by one or more data processors, one or more chemical structures for the detected one or more chemical names" by "detecting, by one or more data processors, one or more chemical names present within a text document," as recited in claim 24. (*See* App. Br. 21.)

Specifically, Appellants argue that Zamora does not teach or suggest extracting chemical structure from a text. (*See* App. Br. 22.) Appellants argue that even though Murray-Rust teaches displaying chemical structures, it does not teach displaying structures generated from text documents. (*See id.* 22–23.) Appellants ague further that although Vander Stouw teaches converting systematic names of organic compounds into atom-bond connection tables, the method it teaches uses keyboard or computer-readable input, not input as detected from a text document. (*See id.* 23–24.) We are not persuaded by these arguments because each attacks the references individually. "Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references." *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). The Examiner's rejection is based on the combination of the teachings of Zamora, Murray-Rust, and Vander Stouw.

Appellants also argue that

> one of ordinary skill in the art would not have been motivated at the time of the invention to modify the teachings of Zamora, which is directed to extracting, from text documents such as journals, facts about chemical reactions and storing those facts in discourse and RIF frames, to include the computer program for translating inputted chemical names into a connection table as taught by Vander Stouw. Zamora teaches using linguistics to extract chemical reaction information, while Vander Stouw teaches a program that requires manually inputting chemical names into a program to translate the chemical names into connection tables. There is simply no motivation to make such a combination due to the disparate methods of processing chemical data. There was also no motivation for one of ordinary skill in the art to combine the teachings of Zamora with Murry-Rust [sic], which is directed to a chemical markup language and XML, and thus would serve no purpose with respect to the teachings of Zamora (Zamora was published in 1984).

(App. Br. 25.)

Appellants do not address the Examiner's finding that one of ordinary skill in the art would have modified the teachings of Zamora to include translating the chemical names into a connection table as taught in Vander Stouw to provide a more robust tool and database for management of complex chemical content. (*See* Final Act. 8.) In addition, Appellants do not address the suggestion in Zamora to add chemical structure information to the extracted text to improve the methods taught. (*See* Final Act. 8, citing Zamora 188.) Appellants do not explain why these reasons and suggestions to modify the teachings of Zamora with the teachings of Vander Stouw and Murray-Rust are not sufficient to show that the claimed method would have been obvious.

The Supreme Court explained that the obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). Because the Examiner provided an explanation why those of skill in the art would have combined teachings of the cited prior art and Appellants do not explain why this explanation of the Examiner's reasoning is incorrect, we are not persuaded that the preponderance of the evidence indicates the Examiner erred.

Claim 27

Appellants argue separately for the patentability of claim 27. (*See* App. Br. 26–28.) Claim 27 recites:

> The method of claim 24, further comprising validating, by one or more data processors, the identified one or more chemical reactions by comparing one or more of the number of educts, the number of products or the number of unidentified compounds, against a predefined threshold.

(App. Br. 36, Claims App'x.)

The Examiner finds that even though the limitations of claim 27 are not expressly taught in the art cited, Zamora suggests validation procedures by comparing chemical reactant names to the number of occurrences of specific lexicon terms. (*See* Ans. 9, citing Zamora 187 and Table VIII.) Table VIII of Zamora describes the number of occurrences of specific fields (for example, "product" and "reactant") and the percentage of success for correct identification. Thus, we agree with the Examiner that Zamora teaches relying on the number of certain occurrences to validate the method. Furthermore, the Examiner explains that the cited portion of Zamora refers

to increasing the lexicon, and thus creating thresholds, to determine if certain words are part of a chemical name or not. (*See* Ans. 9.) The Examiner finds that because Appellants' Specification does not provide a definition of the claim term "threshold," Zamora suggests using a threshold within the scope of claim 27. (*See id.*) Because these teachings suggest using certain terms, we agree with the Examiner that Zamora suggests using terms such as educts, products, and unidentified compounds to validate the method against a threshold as claimed.

Appellants do not provide separate arguments for the rejections of the other dependent claims rejected over Zamora, Murray-Rust, and Vander Stouw or of claims 41–43, which were rejected over Zamora, Murray-Rust, Vander Stouw, and Castano. Accordingly, we are not persuaded the Examiner erred in rejecting Appellants' claims as being obvious under 35 U.S.C. § 103(a).

Conclusion

Upon consideration of the record and for the reasons given, the rejections of Appellants' claims under 35 U.S.C. § 101 and 35 U.S.C. § 103(a) are sustained.

Therefore, we affirm the decision of the Examiner.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136.

AFFIRMED