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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte EDWARD K.Y. JUNG and LOWELL L. WOOD, JR.

Appeal 2013-005465
Application 12/283,128
Technology Center 1600

Before JEFFREY N. FREDMAN, ULRIKE W. JENKS, and CHRISTOPHER G. PAULRAJ, *Administrative Patent Judges*.

PAULRAJ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal[1] under 35 U.S.C. § 134 involving claims to a computer system for identifying and treating pathogen variants. The Examiner rejected the claims for obviousness and obviousness-type double patenting. We have jurisdiction under 35 U.S.C. § 6(b). We affirm and enter a new ground of rejection under 35 U.S.C. § 101.

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[1] Appellants identify the Real Party in Interest as Searate, LLC, an affiliate of Intellectual Ventures Management, LLC (*see* Appeal Br. 2).

STATEMENT OF THE CASE

Background

The Specification relates generally to "[m]ethods and systems [that] involve identifying primary pathogens as well as variants of the pathogens and treatments." *See* Spec. 2 (Summary).

The Claims

Claims 48–50, 54–61, and 78–84 are under appeal, and are reproduced in the Claims Appendix of the Appeal Brief. Independent claim 48 is representative and reads as follows:

> A system comprising:
> at least one processor; and
> a computer program product for use with a computer system and wherein the computer program product includes a plurality of instructions executable by the at least one processor, the plurality of instructions including but not limited to:
> a set of instructions for identifying at least one primary pathogen associated with a disease state;
> a set of instructions for predicting at least one pathogenic variant of the at least one primary pathogen;
> a set of instructions for estimating a probability of an existence of the at least one predicted pathogenic variant in a given individual; and
> a set of instructions for identifying at least one second treatment targeting the at least one predicted pathogenic variant.

Appeal Br. 82 (Claims App'x).

The Rejections

The Examiner has rejected the claims as follows:

I. Claims 48–50, 54–61, and 78–84 under 35 U.S.C. § 103 as being unpatentable over Smith[2] together with Burdette[3] and Chee,[4] Armour,[5] or Holland-Staley.[6]

II. Claims 48–50, 54–61, and 78–84 under 35 U.S.C. § 103 as being unpatentable over Modrow[7] and Barin,[8] together with Burdette and Chee, Armour, or Holland-Staley.

III. Claims 48–50, 54–61, and 78–84 under 35 U.S.C. § 103 as being unpatentable over Prior,[9] Smith, and Modrow, together with Burdette and Chee, Armour, or Holland-Staley.

IV. Claims 48–50, 54–61, and 78–84 for non-statutory obviousness-type double patenting as being unpatentable over Application No. 11/487,133.

V. Claims 48–50, 54–61, and 78–84 for non-statutory obviousness-type double patenting as being unpatentable over Application No. 12/283,158.

VI. Claims 48–50, 54–61, and 78–84 for non-statutory obviousness-type double patenting as being unpatentable over Application No. 12/283,184.

June 13, 2012 Non-Final Action ("Non-Final Act."), 6–24.[10]

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[2] Smith et al., *Mapping the Antigenic and Genetic Evolution of the Influenza Virus*, 305 Science 371–76 (2004) ("Smith").
[3] Burdette et al., *Killing Bugs at the Bedside: A prospective hospital survey of how frequently personal digital assistants provide expert recommendations in the treatment of infectious diseases*, 3 Annals of Clin. Microbiology and Antimicrobials 1–6 (2004) ("Burdette").
[4] Chee et al., US Patent 5,861,242, issued Jan. 19, 1999 ("Chee").
[5] Armour et al., US Patent 6,586,430 B1, issued July 1, 2003 ("Armour").

OBVIOUSNESS REJECTIONS

The Examiner has set forth three separate obviousness rejections, each of which rely upon Burdette, Chee, Armour, or Holland-Staley, together with Smith, Modrow, Barin, and/or Prior. For the reasons set forth below, we affirm the obviousness rejection based on the teachings of Modrow, Barin, and Chee. We do not rely upon the other references as the basis for our affirmance. *See In re Kronig*, 539 F.2d 1300, 1303 (CCPA 1976) (Board may rely upon less than all the references cited by Examiner in affirming a rejection without designating a new ground).

The Examiner finds that "Modrow teaches prediction of amino acid sequences of the envelope proteins of seven different HIV strains." Non-Final Act. 12. The Examiner further finds that Barin "teaches that viral envelope proteins (gp160 and gp120) are the most consistently recognized by antibodies found in patients with the acquired immune deficiency syndrome (AIDS)." *Id.* at 13. The Examiner asserts that:

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[6] Holland-Staley, Pub. No. US 2007/0172926 A1, published July 26, 2007 ("Holland-Staley").
[7] Modrow et al., *Computer-Assisted Analysis of Envelope Protein Sequences of Seven Human Immunodeficiency Virus Isolates: Prediction of Antigenic Epitopes in Conserved and Variable Regions*, 61 J. Virology 570–78 (1987) ("Modrow").
[8] Barin et al., *Virus Envelope Protein of HTLV-III Represents Major Target Antigen for Antibodies in AIDS Patients*, 228 Science 1094–96 (1985).
[9] Prior et al., Publication US 2005/0055188 A1, published Mar. 10, 1985.
[10] Appellants incorrectly refer to the grounds of rejection from an earlier Office Action in their Appeal Brief (Appeal Br. 4), but respond to the most recent grounds of rejection in their Reply Brief (Reply Br. 2–18). We consider Appellants' arguments only to the extent they are applicable to the rejections set forth in the June 13, 2012 Non-Final Action and addressed in the Examiner's Answer.

> It would have been *prima facie* obvious to one skilled in the art to be motivated to identify HIV pathogenic variants of envelope glycoproteins as taught in Modrow because knowledge of such variant structures will enable detection of antibodies in patients with AIDS, as taught by Barin. Thus, identifying HIV pathogenic variants of envelope glycoproteins will allow identifying presence of the acquired humoral response (which is viewed as viewed as [sic] a "treatment targeting pathogen"). Further, as merely using a computer to automate a known process does not by itself impart nonobviousness to the invention it would have been *prima facie* obvious to computerize the combined teaching of Modrow et al and Barin and present recommendations as a set of computerized instructions.

Id. at 13–14.

The Examiner acknowledges that "[a] combination of Modrow and Barin does not teach estimating probability of an existence of a pathogen using a computing device," but asserts that "[i]nasmuch as the step of estimating probability of existence of a virus in an individual is interpreted to encompass detecting/diagnosing the presence of a variant in an individual, such detecting/diagnosing is a routine step in determining effective antiviral therapy as exemplified by," *inter alia*, Chee. *Id.* at 14. The Examiner finds that Chee teaches "a DNA chip (and method of use) for diagnosing/detecting (i.e. estimating the probability of) HIV variants in patients," and "that this is important so that therapy can be changed as drug-resistant variants are detected." *Id.*

We determine that the Examiner has made a prima facie showing of obviousness based on the combination of Modrow, Barin, and Chee. We are not persuaded by Appellants' arguments to the contrary. Appellants focus their arguments on the limitations of "estimating a probability of an existence of the at least one predicted pathogenic variant in a given

individual" (claims 48, 78) and "designating at least one group of the at least one predicted pathogenic variant" (claim 78). Reply Br. 9–12.

Although we agree with the Examiner's observation that the Specification teaches that "[e]stimating the probability of existence includes, but is not limited to, clinical differential diagnosis techniques" (Spec. 8, ll. 7–9), we do not agree with the Examiner's conclusion that the recited step is no different than simply "'identifying a pathogen.'" Non-Final Act. 10. The claims require "estimating a probability of an existence of the at least one predicted pathogenic variant *in a given individual*." Cl. 48 (emphasis added). Under our broadest reasonable interpretation, we determine that the claim language requires a differential diagnosis that would distinguish the existence of one variant of the pathogen from another variant of the pathogen within a given individual/patient.

We nonetheless find that the Examiner has shown that at least the Chee reference suggests the disputed limitations, and, in combination with Modrow and Barin, renders the claims as a whole obvious. Chee teaches the use of an array of nucleic acid probes on biological chips for diagnosis of HIV. Chee, Title. More specifically, Chee teaches:

> [a]fter [the HIV] virus acquires drug resistance via a mutation, the patient suffers dramatically increased viral load, worsening symptoms (typically more frequent and difficult-to-treat infections), and ultimately death. Switching to a different treatment regimen as soon as a resistant mutant virus takes hold may be an important step in patient management which prolongs patient life and reduces morbidity during life.

Chee, 4:37–44. Chee further teaches:

> When the immune system in AIDS patients fails, these normally latent pathogens can grow and generate rampant infection. In treating such patients, it would be desirable

> simultaneously to diagnose the presence or absence of a variety of the most lethal common infections, determine the most effective therapeutic regime against the HIV virus, and monitor the overall status of the patient's infection.
>
> The present invention provides DNA chips for detecting the multiple mutations in HIV genes associated with resistance to different therapeutics. These DNA chips allow physicians to monitor mutations over time and to change therapeutics if resistance develops. Some chips also provide probes for diagnosis of pathogenic microorganisms that typically occur in AIDS patients.

Id. at 5:21–35.

The foregoing teachings of Chee suggest the following limitations recited in independent claims 48 and 78: a) "identifying at least one primary pathogen associated with a disease state" (i.e., HIV, associated with AIDS); b) "predicting at least one pathogenic variant of the at least one primary pathogen;" (i.e., mutations of HIV); c) "estimating a probability of an existence of the at least one predicted pathogenic variant in a given individual; and" (i.e., using DNA chips to monitor mutations of HIV and diagnosing pathogenic microoganisms associated with HIV infection); and d) "identifying at least one second treatment targeting the at least one predicted pathogenic variant" (i.e., switching to a different treatment regimen as soon as a resistant mutant virus takes hold). Furthermore, Chee provides a table of the most common mutations of HIV reverse transcriptase, which satisfies the requirement for "designating at least one group of the at least one predicted pathogenic variant" set forth in claim 78. Chee, 4:45–5:10 (Table 1); 15:8–11. Contrary to Appellants' arguments, neither the claims nor the Specification require determining a numerical value (e.g., in terms of percentage) in order satisfy the "estimating a probability" requirement. We find under our claim construction that the requirement is

satisfied by Chee's teachings regarding the differential diagnosis of patients infected with HIV.

A skilled artisan would have recognized that the diagnosis of HIV variants using DNA chips as taught by Chee would involve the use of a computing device. Moreover, as noted by the Examiner (Non-Final Act. 12), Modrow further teaches the prediction of antigenic epitopes for the envelope proteins of seven different HIV strains using a computer, which may be used to identify vaccine/antibody candidates as potential treatment options for those HIV strains. *See* Modrow, 572 ("we predicted antigenic determinants in the amino acid sequences [of envelope protein gp120] with a computer program which predicted the secondary structure and calculated the values for hydrophilicity"); Barin, 228 (teaching that gp120 represents a major target antigen for antibodies in AIDS patients). In view of these teachings, a skilled artisan would have found it obvious to implement a computer system programmed to identify HIV variants and treatment options for such variants.

To the extent that the references do not explicitly teach the use of a computing device to perform any of the recited instructions, we agree with the Examiner that the skilled artisan would have found it obvious to implement those steps using a computer. The use of a computer to automate the steps of a known process is generally obvious. *Cf. Leapfrog Enterprises, Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1161 (Fed. Cir. 2007) ("Accommodating a prior art mechanical device that accomplishes [the goal of teaching a child to read phonetically] to modern electronics would have been reasonably obvious to one of ordinary skill in designing children's learning devices.").

We therefore affirm the obviousness rejection of independent claims 48 and 78 in view of the teachings of Modrow, Barin, and Chee. Appellants have not argued the dependent claims separately, and therefore those claims fall with their respective independent claims. 37 C.F.R. § 41.37(iv).

OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTIONS

The Examiner entered obviousness-type double patenting rejections over the claims of Application Nos. 11/487,133, 11/283,158, and 11/283,184. Application No. 11/487,133 was abandoned on December 16, 2014, and therefore the Examiner's rejection based on that application is rendered moot.

The other two co-pending applications have not been abandoned and we address the merits of the rejections. With respect to both Application Nos. 11/283,158, and 11/283,184,[11] Appellants argue that the Examiner failed to articulate or provide a full and reasoned explanation as to why the claim recitations in claims 48–50, 54–61, and 78–84 are anticipated by or rendered obvious by any specific claim of those co-pending applications. Reply Br. 18. We disagree. The Examiner has pointed out that the claims recite essentially the same limitations, with the claims of the present application directed to a "system" with a "computer program product" containing instructions for performing similar steps to those recited in the claims of the other co-pending applications. Appellants have not pointed to any other meaningful difference between the claims. The Examiner has set

[11] Application Nos. 11/283,158, and 11/283,184 are available as references under 35 U.S.C. § 121 because they claim priority as divisionals of a different application (Application No. 11/525,760, filed Sept. 22, 2006) than the priority claim (Application No. 11/487,133, filed July 13, 2006) for the present application.

forth a sufficient rationale insofar as it would have been obvious to implement the same methods on a computer system. We thus affirm the obviousness-type double patenting rejection over co-pending Application Nos. 11/283,158, and 11/283,184.

NEW GROUND OF REJECTION

Within our authority under 37 C.F.R. § 41.50(b), we enter the following new ground of rejection.

Claims 48–50, 54–61, and 78–84 are rejected under 35 U.S.C. § 101 as being drawn to a patent-ineligible abstract idea as set forth by the Supreme Court in *Mayo Collaborative Servs. v. Prometheus Labs.*, 132 S. Ct. 1289, 1297 (2012) ("*Mayo*") and *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2358–59 (2014) ("*Alice*").

In accordance with the *Mayo/Alice* framework for determining patent eligibility, we must determine whether a claim that is drawn to a statutory class of subject matter (process, machine, manufacture, or composition of matter) is a) otherwise "directed to" a judicially recognized exception (i.e., law of nature, natural phenomena, or abstract idea) and, if so, b) whether the claim recites additional elements that amount to "significantly more" than the judicial exception. *See 2014 Interim Guidance on Patent Subject Matter Eligibility*, 79 Fed. Reg. 74618, 74621 (Dec. 16, 2014).

Here, although the claims are drawn to a statutory class (machine), we determine that each of the claims are directed to a patent-ineligible abstract idea insofar as they are directed generally to the identification of medical treatment options for pathogen variants. *See, e.g.*, Cl. 48 (reciting instructions for a) "identifying at least one primary pathogen associated with a disease state"; b) "predicting at least one pathogenic variant of the at least one primary pathogen;" c) "estimating a probability of an existence of the at

least one predicted pathogenic variant in a given individual; and" d) "identifying at least one second treatment targeting the at least one predicted pathogenic variant."). The claims do "no more than call on a 'computing device,' with basic functionality for computing stored and input data and rules, to do what doctors routinely do." *Cf. SmartGene, Inc. v. Advanced Biological Labs., SA*, 555 F. App'x 950, 954–55 (Fed. Cir. 2014) ("Whatever the boundaries of the 'abstract ideas' category, the claim at issue here involves a mental process excluded from section 101: the mental steps of comparing new and stored information and using rules to identify medical options."). The claims at issue here are not meaningfully distinguishable from those found to be ineligible for patent protection in *SmartGene*.

As recognized in *SmartGene*, the fact that a computer is used to perform the recited steps does not add "significantly more" to the abstract idea embodied in the claims. Furthermore, the fact that the claims are drawn to a computer system rather than to a method also makes no difference in the analysis. The use of a generic computer to identify information and estimate a probability simply takes advantage of some of the "most basic functions a computer." *Cf. Alice*, 134 S. Ct. at 2359–60 ("Because petitioner's system and media claims add nothing of substance to the underlying abstract idea, we hold that they too are patent ineligible under § 101.").

SUMMARY

We affirm the rejection of claims 48–50, 54–61, and 78–84 under 35 U.S.C. § 103 as being unpatentable over the combination of Modrow, Barin, and Chee.

We dismiss as moot the rejection of claims 48–50, 54–61, and 78–84 for non-statutory obviousness-type double patenting as being unpatentable over Application No. 11/487,133.

We affirm the rejections of claims 48–50, 54–61, and 78–84 for non-statutory obviousness-type double patenting as being unpatentable over Application Nos. 11/283,158, and 11/283,184.

We enter a new ground of rejection of claims 48–50, 54–61, and 78–84 under 35 U.S.C. § 101 as being drawn to a patent-ineligible abstract idea.

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b) (Sept. 13, 2004; revised, 76 FR 72270, Nov. 22, 2011, effective Jan. 23, 2012). 37 C.F.R. § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the Appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

1) Reopen prosecution. Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner.
2) Request rehearing. Request that the proceeding be reheard under § 41.52 by the Board upon the same record.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED; 37 C.F.R. § 41.50(b)