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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte KATHARINE LYNN ROWLEY GRANT and BERNHARD SCHMIDT

Appeal 2017-006563[1]
Application 13/594,943[2]
Technology Center 3700

Before TONI R. SCHEINER, JAMES A. WORTH, and RYAN H. FLAX, *Administrative Patent Judges*.

WORTH, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's final rejection of claims 1, 3–7, 9–13, 15, 17, 19, and 21–26, which are all pending claims. We have jurisdiction under 35 U.S.C. §§ 134 and 6(b).

We reverse.

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[1] Our Decision refers to Appellants' Appeal Brief ("Appeal Br.," filed Jan. 3, 2016) and Reply Brief ("Reply Br.," filed Mar. 20, 2017), the Examiner's Final Office Action ("Final Act.," mailed June 2, 2016) and Answer ("Ans.," mailed Feb. 9, 2017), as well as Appellants' Specification ("Spec.," filed Aug. 27, 2012).

[2] According to Appellants, the real parties in interest for this appeal are "Siemens Medical Solutions USA, Inc. of Malvern, PA, U.S.A. and Siemens Aktiengesellschaft of Munich, Germany." Appeal Br. 1.

Statement of the Case

Background

Appellants' application relates to "a system for automatically adaptively selecting a medical image acquisition protocol usable by a Computed Tomography (CT), X-ray or other imaging system based on [the] time duration it takes injected contrast agent to reach a peak concentration." Spec. 1:8–11.

According to the Specification, in some patients, where an injected contrast agent "peaks" (maximizes imaging potential) earlier than average, patients may be over-radiated due to acquisition of data beyond a necessary time point. *Id.* at 1:21–23. In other patients, especially patients with poor or low cardiac output, their contrast agent peaks substantially later, resulting in a longer contrast agent "fall off" period that gets "cut off," i.e., not imaged. *Id.* at 1:23–25. This latter situation may result in inaccuracies with diagnosis and potentially problems with treatment. *Id.* at 1:25–28. The invention addresses these problems with a contrast agent peak time detector that detects a contrast agent peak time and an imaging processor that adaptively selects an image acquisition protocol in response to a comparison of a detected contrast agent peak time with at least one of the plurality of ranges. *See id.* at 2:5–6, 2:28–30.

The Claims

Claims 1, 13, 17, 25, and 26 are the independent claims on appeal. Claim 1, reproduced below, is illustrative of the subject matter on appeal:

> 1. A computer implemented system for automatically adaptively selecting a medical image acquisition protocol usable by a Computed Tomography (CT) or X-ray imaging system, comprising:

an imaging system of a Computed Tomography (CT) or X-ray imaging system using an initial image acquisition protocol to acquire an image of an anatomical region of interest of a patient using a corresponding predetermined number of scanning cycles during a predetermined scanning time period;

a repository comprising:

(i) an average contrast agent time to peak time period for a sample patient population based on time periods from when contrast agent concentrations substantially reach peak values in anatomical regions of interests of patients in the population relative to start times of contrast agent injections in the patients; and (ii) a plurality of predetermined different image acquisition protocols; each image acquisition protocol adapted to acquire the image of an anatomical region of interest of a patient using a corresponding predetermined number of scanning cycles during a corresponding predetermined scanning time period;

a contrast agent peak time detector to detect a time that a contrast agent concentration substantially reaches a peak value in the anatomical region of interest of the patient; and

an imaging processor to measure and record values associated with radiation attenuation and a presence of the contrast agent in the region of interest of the patient and to: (i) determine a contrast agent time to peak time period from a time of a start of contrast agent injection to the detected contrast agent peak time; (ii) compare, in response to a detection by the peak detector of a time for the contrast agent to peak in the patient region of interest, the contrast agent time to peak time period to the average contrast agent time to peak time period stored in the repository; (iii) determine whether the contrast agent time to peak time period exceeds or is lower than a predetermined difference threshold from the average contrast agent time to peak time period; (iv) adaptively select, in response to determining said detected contrast agent time to peak time period exceeds the predetermined difference threshold of the average contrast agent time to peak time period, a first image acquisition protocol from said plurality of predetermined image acquisition protocols, said first image

> acquisition protocol adapted to acquire the image of the anatomical region of interest of the patient using at least one of: (1) an extended scanning time period that is greater than the predetermined scanning time period of the initial image acquisition protocol; and (2) a number of scanning cycles that is greater than the predetermined number of scanning cycles of the initial image acquisition protocol; and (v) adaptively select, in response to determining said detected contrast agent time to peak time period is lower than the predetermined threshold of the average contrast agent time to peak time period, a second image acquisition protocol from said plurality of predetermined image acquisition protocols, said second image acquisition protocol adapted to acquire the image of the anatomical region of interest of the patient using at least one of: (1) a scanning time period that is less than the predetermined scanning time period of the initial image acquisition protocol; and (2) a number of scanning cycles that is less than the predetermined number of scanning cycles of the initial image acquisition protocol;
>
> where, in response to the adaptive selection of the first imaging protocol or the second imaging protocol, images of the anatomical region of interest of the patient are acquired by the imaging system of the at least one of the CT or X-ray imaging system using the first imaging protocol or the second imaging protocol, respectively.

Appeal Br., Claims App.

The Issues

A. The Examiner rejected claims 1, 3–7, 9–13, 15, 17, 19, and 21–26 under 35 U.S.C. § 101 as being directed to patent ineligible subject matter.

B. The Examiner rejected claims 1, 6, 7, 9–13, 15, 17, and 21–26 under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Chomas[3] and Abe[4].

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[3] Chomas, US 2005/0187476 A1, pub. Aug. 25, 2005.
[4] Abe, US 7,467,006 B2, iss. Dec. 16, 2008.

C. The Examiner rejected claims 3–5 and 19 under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Chomas, Abe, and Liu[5].

A. 35 U.S.C. § 101

The Examiner determines that "[t]he invention is a CT or X-ray imaging device, for use on a patient who undergoes contrast agent perfusion, which detects the rise-and-fall profile characterizing the contrast agent uptake and depending on the type of profile, adjust[s] the scanning protocol so as to avoid over- or under-radiating the patient." Final Act. 5. The Examiner determines that "[t]he judicial exception recited in the claim is an abstract idea of comparing new and stored information and using rules to identify options." *Id.* The Examiner further determines that "[t]he claim as a whole does not recite significantly more than the judicial exception itself because each step does no more than require a generic computer to perform generic computer functions"; "[t]he claims do not purport to improve the functioning of the computer itself or to improve any other technology"; "the scanner is being used in a conventional manner"; "the contrast agent is introduced in a generic manner"; "[c]ontrast agent perfusion kinetics is a well-known field of study"; and that the claimed invention "automates the step of detecting well-known perfusion profiles and performing a scan," which is routine. *Id.* at 5–6.

Appellants argue, *inter alia*, that the Examiner has overgeneralized the claim, that the use of rules in and of themselves is not dispositive of the question of patentability (citing *McRO, Inc. dba Planet Blue v. Bandai*

[5] Liu, US 2003/0036694 A1, pub. Feb. 20, 2003.

Namco Games America Inc., 837 F.3d 1299 (Fed. Cir. 2016)), and that the claims are directed to a technological improvement. Appeal Br. 13. Appellants further argue that the Final Office Action falls short of the required explanation of why the elements taken individually and in combination do not amount to a claim as a whole that is significantly more than the abstract idea. *Id.* at 14–15 (citing *BASCOM Global Internet Services, Inc. v. AT&T Mobility LLC*, 827 F.3d 1341 (Fed. Cir. 2016)).

The statutory provision at issue, 35 U.S.C. § 101, states 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, subject to the conditions and requirements of this title."

"Laws of nature, natural phenomena, and abstract ideas are not patentable." *Mayo Collaborative Services v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012) (internal quotation and alteration omitted). The Supreme Court articulated a two-step test for patent eligibility under § 101 that "distinguish[es] patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts." *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355 (2014) (citing *Mayo*, 132 S. Ct. at 1296–97). "First," *Alice* instructs a court to "determine whether the claims at issue are directed to one of those patent-ineligible concepts." *Id.* If the claims are directed to a patent ineligible concept, then the court must proceed to the second step of the test—the "search for an inventive concept—i.e., an element or combination of elements that is sufficient to ensure that the patent in practice amounts to

significantly more than a patent upon the ineligible concept itself." *Id.* (internal quotations and alterations omitted).

Assuming, for the sake of argument that, under step one of the *Alice* inquiry, we agree with the Examiner's determination that independent claim 1 is abstract because it is rule-based (*see* Final Act. 5), we must turn to step two of the *Alice* inquiry to determine whether the claim amounts to significantly more. We are persuaded by Appellants, in this regard, that the Examiner has not established that the elements, taken individually and as an ordered combination, do not amount to significantly more than the mere abstract idea. *See* Appeal Br. 14.

The Examiner essentially determines that the claimed scanner is used in a conventional manner and that contrast agent perfusion kinetics is well-known. Final Act. 5–6. Although the Examiner determines that the contrast agent is introduced in a generic manner and perfusion profiles are well-known, the Examiner does not make a determination that it was well-known to measure an individual's contrast time to peak, nor that it was well-known to compare that individual's contrast time to peak with an average agent time to peak for a population of patients, as recited in independent claim 1.

Moreover, on the basis of this record, we are persuaded by Appellants' that independent claim 1 presents an analogous situation to that in *BASCOM Global Internet Services, Inc. v. AT&T Mobility LLC*, 827 F.3d 1341 (Fed. Cir. 2016). In *BASCOM*, the claim was directed to an inventive concept of installing a filtering tool at a specific location, remote from end-users, with customizable filtering features specific to each end user. *Id.* at 1350. The Federal Circuit explained that "an inventive concept can be found in the non-conventional and non-generic arrangement of known,

conventional pieces." *Id.* The court ultimately concluded that the particular arrangement of elements is a technical improvement over prior art ways of filtering such content, and may be read to improve an existing technological process. *Id.* at 1351. Here, independent claim 1 addresses a problem rooted in the technology itself, i.e., the need to minimize radiation dose while maximizing image data collection. *See* Spec. 4:29–31; *see also DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014) (patentable subject matter where claim addresses problem rooted in computer technology).

Responding to an argument that the Examiner has performed an analysis that resembles an obviousness analysis, the Examiner submits that *BASCOM* was not relied on, e.g., as in a prior art rejection. *See* Ans. 10. However, we do not understand the Examiner to have substantively responded to Appellants' argument that the claims at issue are directed to patent-eligible subject matter as in *BASCOM*.

We also conclude that the facts here are also analogous to those in *Vanda Pharmaceuticals Inc. v. West-Ward Pharmaceuticals Int'l Ltd.*, 887 F.3d 1117 (2018). In *Vanda*, the claims, *inter alia*, recited the steps of carrying out a dosage regimen based on the results of genetic testing. *Vanda*, 887 F.3d at 1135. Similarly, here the claims essentially control a dosage of radiation based on the results of testing for a contrast agent's time to peak.

We note that the Examiner has not made a determination that independent claim 1 recites a natural relationship or natural law, and we do not so determine. Rather, the claims are based on the injection of contrast agent and the selection of a scanning protocol. To the extent that there is a

natural metabolism of contrast agent, the claimed invention is directed to an application that alters the exposure to radiation in response thereto, and adjusts the timing of images. *See Vanda*, 887 F.3d at 1135.

Accordingly, for the reasons above, we reverse the Examiner's patent-eligibility rejection.

B. 35 U.S.C. § 103 over Chomas and Abe

The Examiner determines that Chomas substantially discloses the invention of independent claim 1, and relies on Abe for the teaching that contrast values have a direct influence on the nature of a scanning protocol. Final Act 7 (citing Abe, 3:64–4:10); Ans. 11–12. The Examiner reasons that it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the decision-making of Abe to the profiles of Chomas, in order to provide a proper response to characteristic contrast-enhancement profiles in order to ensure patient safety. Final Act. 7.

Appellants argue that Chomas and Abe fail to disclose adaptive selection, as recited in independent claim 1, i.e., "adaptively select, in response to determining said detected contrast agent time to peak time period exceeds the predetermined difference threshold of the average contrast agent time to peak time period, a first image acquisition protocol from said plurality of predetermined image acquisition protocols." Appeal Br. 19; *see also id.* at 3–4, Claims App.

The issue with respect to this rejection is: Does a preponderance of the evidence of record support the Examiner's conclusion that Chomas and Abe render obvious claims 1, 6, 7, 9–13, 15, 17, and 21–26?

We are persuaded by Appellants that Abe fails to disclose adaptive selection, as recited in independent claim 1. The portion of Abe relied on by

the Examiner discloses a method of reducing repetition time following a concentration increase and increasing repetition time during the concentration decreasing period. Abe, 3:64–4:10. However, Abe does not disclose comparing contrast agent time to peak to the average contrast agent time to peak, as recited in independent claim 1. The Examiner does not rely on additional evidence or reasoning to remedy the deficiency.

Accordingly, we reverse the Examiner's rejection under 35 U.S.C. § 103 over Chomas and Abe of independent claim 1. We also reverse the Examiner's rejection under 35 U.S.C. § 103 of claims 6, 7, and 9–12, which depend therefrom.

Independent claims 13, 17, 25, and 26 contain similar language and requirements as independent claim 1. We, therefore, reverse the Examiner's rejection under 35 U.S.C. § 103 of claims 13, 17, 25, and 26, for similar reasons as for independent claim 1. We also reverse the Examiner's rejection under 35 U.S.C. § 103 of claims 15 and 21–24, which each depend from one of claims 13 and 17.

C. 35 U.S.C. § 103 over Chomas, Abe, and Liu

The Examiner does not rely on Liu or on additional reasoning to remedy the deficiency in the rejection based on Chomas and Abe, as discussed above. Accordingly, we reverse the Examiner's rejection of claims 3–5 and 19 under 35 U.S.C. § 103 over Chomas, Abe, and Liu.

DECISION

The Examiner's decision to reject claims 1, 3–7, 9–13, 15, 17, 19, and 21–26 is reversed.

REVERSED