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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CARL DEIRMENGIAN, GEORGE MIKHAIL,
and GLEN PIERSON¹

Appeal 2018-003665
Application 12/909,220
Technology Center 3700

Before JENNER D. BAHR, JOHN C. KERINS, and
FREDERICK C. LANEY, *Administrative Patent Judges*.

KERINS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Carl Deirmengian et al. (“Appellants”) appeal under 35 U.S.C.
§ 134(a) from a final rejection of claims 1–20. We have jurisdiction under
35 U.S.C. § 6(b).

We REVERSE.

¹ DePuy Synthes Products, Inc., is identified as the real party-in-interest.
Appeal Br. 2.

THE INVENTION

Appellants' invention "relates to a system and method for tracking the process of bone healing and, in particular, systems and methods that calculate a ratio of strain at multiple locations along an implant and/or a bone." Spec. 2. Claims 1 and 15, reproduced below, are illustrative:

1. A device for treating bone in a living body, comprising:

an implant configured for attachment to an exterior of a bone;

a first sensor measuring a strain on a first portion of the implant, the first portion of the implant being configured to be mechanically coupled to a weakened portion of a bone when the implant is coupled to the bone in a target position; and

a second sensor isolated between two bone fixation element receiving holes of the implant measuring strain in a non-weakened portion of the bone.

15. A method, comprising:

measuring strain on a first portion of an implant via a first sensor which, when the implant is coupled to a bone in a desired configuration, is mechanically coupled to a fracture of the bone, the implant being attached to an exterior of a bone;

measuring a second strain spaced from the fracture in a non-weakened portion of the bone via a second sensor isolated between two bone fixation element receiving holes of the implant; and

determining a ratio of the strain measured by the first sensor to the strain measured by the second sensor to normalize an effect of loads on the bone.

THE REJECTIONS

The Examiner rejects:

(i) claims 15–20 under 35 U.S.C. § 101 as constituting non-statutory subject matter, to wit, as being directed to a judicial exception, without significantly more;

(ii) claims 1–7 and 9–20 under 35 U.S.C. § 103(a) as being unpatentable over Morgan (US 8,083,741 B2, issued Dec. 27, 2011) (hereafter “Morgan ‘741”), in view of Morgan (US 2008/0300597 A1, published Dec. 4, 2008) (hereafter “Morgan ‘597”); and

(iii) claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Morgan ‘741, in view of Morgan ‘597 and Avni (US 6,273,863 B1, issued Aug. 14, 2001).

ANALYSIS

Claims 15–20--35 U.S.C. § 101

Introduction

Having reference to claim 15 reproduced above, the Examiner takes the position that “[t]he step of determining a ratio, as recited, is a mental process that can be performed in the human mind, or by a human using pen and paper,” and is thus an abstract idea. Final Act. 3. According to the Examiner, the further steps of “measuring strain on a first portion of an implant,” and “measuring a second strain,” are extra-solution activity in the form of data gathering steps that do not amount to significantly more than the abstract idea itself. *Id.* The Examiner also takes the position that “the particular arrangement of the sensors on the implant and the positioning of the implant on the bone is well within the understanding of one skilled in the

art,” and that this “does not amount to a non-conventional arrangement because one of ordinary skill in the art would readily and intuitively understand how to position the implant and sensors in order to determine the claimed strain ratio and best monitor healing progress.” Ans. 15–16.

Appellants acknowledge that “the human mind could perform [the] calculation [determining a ratio],” but “only if presented with the strain data that must be supplied by the sensors attached to the bone plates.” Br. 13. Appellants principally counter the Examiner’s position, arguing that the process steps other than the “determining” step involve specific structure including an implant, and a particular arrangement of sensors relative to a bone and the implant attached to the bone. *Id.* at 6–8. Appellants maintain that the Examiner “has failed to ‘explain the reasons that the additional elements taken individually, and also taken as a combination, do not result in the claim as a whole amounting to significantly more than the judicial exception.’” *Id.* at 6.

Principles of Law

An invention is patent-eligible if it claims a “new and useful process, machine, manufacture, or composition of matter.” 35 U.S.C. § 101. However, the Supreme Court has long interpreted 35 U.S.C. § 101 to include implicit exceptions: “[I]aws of nature, natural phenomena, and abstract ideas” are not patentable. *E.g., Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, we are guided by the Supreme Court’s two-step framework, described in *Mayo* and *Alice*. *Id.* at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). In accordance with that framework,

we first determine what concept the claim is “directed to.” *See Alice*, 573 U.S. at 219 (“On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.*, the use of a third party to mitigate settlement risk.”); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) (“Claims 1 and 4 in petitioners’ application explain the basic concept of hedging, or protecting against risk.”).

Concepts determined to be abstract ideas, and thus patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 69 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as “molding rubber products” (*Diamond v. Diehr*, 450 U.S. 175, 191 (1981)); “tanning, dyeing, making water-proof cloth, vulcanizing India rubber, smelting ores” (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. 252, 267–68 (1854))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, the claim at issue recited a mathematical formula, but the Supreme Court held that “[a] claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula.” *Diehr*, 450 U.S. at 187; *see also id.* at 191 (“We view respondents’ claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula.”). Having said that, the Supreme Court also indicated that a claim “seeking patent protection for that formula in the abstract . . . is not accorded the protection of our patent laws, . . . and this principle cannot be circumvented by

attempting to limit the use of the formula to a particular technological environment.” *Id.* (citing *Benson* and *Flook*); *see, e.g., id.* at 187 (“It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.”).

If the claim is “directed to” an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where “we must examine the elements of the claim to determine whether it contains an ‘inventive concept’ sufficient to ‘transform’ the claimed abstract idea into a patent-eligible application.” *Alice*, 573 U.S. at 221 (quotation marks omitted). “A claim that recites an abstract idea must include ‘additional features’ to ensure ‘that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].’” *Id.* (quoting *Mayo*, 566 U.S. at 77). “[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention.” *Id.*

The PTO recently published revised guidance on the application of § 101. *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) (“Guidance”). Under the Guidance, we first look to whether the claim recites:

- (1) any judicial exceptions, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of organizing human activity such as a fundamental economic practice, or mental processes); and
- (2) additional elements that integrate the judicial exception into a practical application (*see* MPEP § 2106.05(a)–(c), (e)–(h)).

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then look to whether the claim:

(3) adds a specific limitation beyond the judicial exception that is not “well-understood, routine, conventional” in the field (*see* MPEP § 2106.05(d)); or

(4) simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.

See Guidance.

Analysis

Claim 15 recites a process, which places the claim in a statutory category of patent-eligible subject matter, subject to a potential judicial exception to eligibility.

The dispute is over whether claim 15 is *directed to* an abstract idea, and, if so, whether the claim recites additional elements that amount to significantly more than the judicial exception. With the recently-issued Guidance, the first inquiries in these determinations are evaluating whether the claim recites a judicial exception, and if it does, whether additional elements are present that integrate the judicial exception into a practical application.

As noted above, in the present appeal, the Examiner characterizes claim 15 as being directed to a judicial exception in the form of an abstract idea, in regarding the claimed step of determining a ratio of first and second strains measured by first and second sensors, respectively, as a mental process that can be performed in the human mind or by a human using pen

and paper. Final Act. 2–3; *see Alice*, 573 U.S. at 219. Appellants do not contest that the recited step of determining the claimed ratio could be performed by a human as a mental step, but maintain that such is the case only upon being provided with the sensor-measured first and sensor strain values. Br. 13. Accordingly, there is agreement as to claim construction at least insofar as claim 15 *includes/recites* an abstract idea in the form of a mental step.

We thus turn our attention to whether additional elements are present in claim 15 that integrate the judicial exception into a practical application. For the reasons discussed below, we find that such additional elements are present in the claim.

Notwithstanding that claim 15 is in the form of a process claim, the process steps implicate and require the presence of certain structure and particular positioning of the sensors in order to perform the claimed strain-measuring steps. As for structure, the claim requires an implant that is attached to the exterior of a bone, and first and second strain-measuring sensors. Br., Claims Appendix. The first sensor is required to measure strain on a first portion of the implant, with the sensor being mechanically coupled to an area in which the bone is fractured. *Id.* The second sensor is to be spaced from the fracture at a non-weakened portion of the bone, and is further isolated between two bone fixation element-receiving holes in the implant. *Id.*

The Examiner advances several assertions in support of the position that claim 15 does not recite additional elements that amount to significantly more than the judicial exception. The Examiner views the recited sensors as being claimed “at a high level of generality and [being] well-understood and

conventional in the technical field.” Final Act. 3. The Examiner takes the position that the steps of measuring strain using the sensors are “extrasolution activity in that they are mere data gathering steps.” *Id.* The particular arrangement of the sensors on the implant and the positioning of the implant on the bone are, according to the Examiner, “well within the understanding of one skilled in the art, so the combination of these elements does not result in a non-conventional and non-generic arrangement.” Ans. 15; see also *id.* at 16 (arrangement of sensors and position of implant on bone are such that a person skilled in the art “would readily and intuitively understand how to position the implant and sensors in order to determine the claimed strain ratio and best monitor healing process.”).

The Examiner does not cite to evidence in support of the contentions as to what allegedly would be understood by the person of ordinary skill in the art. Furthermore, the recently issued Guidance does not have us reach this inquiry until after a determination is made as to whether the claim integrates the judicial exception, in this case, an abstract idea in the form of a mental step, into a practical application. Here, it is apparent that the particular placement of the implant and the positioning of the sensors to be coupled to a fracture (first sensor) and to a non-weakened portion of the bone spaced from the fracture (second sensor), allows for a determination of a ratio of strains measured at the two sensors, in order to normalize the effect of loads on the bone.² This results in a practical application, that of obtaining information as to the load-bearing capability of a fractured and

² This normalization is described in the Specification as providing data as to the stiffness of the bone at the fracture site, which is discussed as being useful in assessing the healing of the fracture. Spec., para. 9.

healing portion of a bone, relative to the load-bearing capability of a non-weakened (intact) area of bone.

Although not couched in terms of integrating a judicial exception into a practical application, the court in *Thales Visionix Inc. v. United States*³ reached the same conclusion in assessing the patent eligibility of a claim fairly similar to claim 15 here on appeal. Claim 22 in that decision involved a method claim for determining an orientation of an object relative to a moving reference frame based on signals received from two inertial sensors mounted in particular locations, one on the object, and the other on the moving reference frame. *Id.* at 1345–46. The orientation-determining step involved the use of at least one mathematical equation, but the court held, “[t]hat a mathematical equation is required to complete the claimed method and system does not doom the claims to abstraction.” *Id.* at 1349.

The court in *Thales Visionix* ultimately found that “[t]he claims specify a particular configuration of inertial sensors and a particular method of using the raw data from the sensors in order to more accurately calculate the position and orientation of an object on a moving platform.” *Id.* Appealed claim 15 before us, too, uses a particular configuration of sensors relative to an implant and fractured bone, and using data from the sensors in order to generate a ratio of strains measured in a fractured bone region and in a non-weakened region, to provide a normalized value or effect of loads on the bone at those locations. To the extent that the claim 15 method might be viewed as less mathematically complex than that in *Thales Visionix*, we regard this as not being germane to the patent eligibility determination.

³ 850 F.3d 1343 (Fed. Cir. 2017).

We appreciate the Examiner's concern that the method of claim 15 does not "include additional limitations that apply or otherwise implement the determined ratio in any meaningful way." Final Act. 15. Although the Examiner is correct that such considerations have been taken into account in prior court decisions involving the patent eligibility of certain methods, with claim 15, as currently presented, the absence of some further step or limitation does not undermine the eligibility of the claim because it integrates the judicial exception (mental process as abstract idea) into a practical application (i.e., the use of a particular configuration of sensors relative to an implant and fractured bone, and using the data from the sensors in order to generate a ratio of strains measured in a fractured bone region and in a non-weakened region, to provide a normalized value or effect of loads on the bone at those locations).

The rejection of claim 15, and of claims 16–20 depending therefrom, under 35 U.S.C. § 101 is not sustained.

Claims 1–7 and 9–20--Obviousness--Morgan '741/Morgan '597

The Examiner finds that Morgan '741 discloses a device as set forth in claim 1, including an implant and first and second sensors for measuring strain on the implant at respective first and second portions of the implant, with the first portion being coupled to a weakened part of the bone, and the second portion being at a non-weakened portion of the bone. Final Act. 5–6. The Examiner acknowledges that Morgan '741 "does not explicitly teach the second sensor is isolated between two bone fixation element receiving holes of the implant." *Id.* at 6. The Examiner cites to Morgan '597 as teaching the positioning of a sensor on an implant, with the sensor being isolated between

two bone fixation element receiving holes. *Id.* The Examiner concludes that it would have been obvious to modify the implant of Morgan ‘741 to have a sensor positioned as in Morgan ‘597, “so as to accurately measure the applied mechanical load across the implant and identify areas of implant that are subject to high bending stresses.” *Id.*, citing Morgan ‘597, Abstract and para. 63.

Appellants argue that the sensors in Morgan ‘597 are not isolated between two fixation element receiving holes of the implant in a non-weakened portion of the bone, as claimed. Br. 14. Although Appellants digress into a discussion to the effect that Morgan ‘597 is configured to measure strains within the interior of the bone, whereas the claimed invention and Morgan ‘741 are directed to measuring strain at the exterior of the bone, it remains the case that the sensors in Morgan ‘597, albeit isolated between fixation element receiving holes, are positioned in a *weakened* portion of the bone, rather than a *non-weakened* portion of the bone, as claimed. Morgan ‘597, para. 82. Thus, the pertinence of Morgan ‘597 to the proposal to modify Morgan ‘741 to provide a sensor isolated between two fixation element receiving holes in a non-weakened portion of a bone is not readily apparent.

Further, Appellants are correct that the Examiner’s articulated reason to modify Morgan ‘741 in view of Morgan ‘597 “provides no insight as to why the configuration of Morgan ‘597 would be beneficial” in the Morgan ‘741 arrangement. Br. 16. Indeed, in further elaborating on the reason as to why it would have been obvious to adopt the proposed modification, the Examiner states that modifying Morgan ‘741 to include a sensor positioned in isolation between two bone fixation holes “does not in any way change

the function of the sensors,” and thus, one of ordinary skill in the art “could have combined the elements,” to yield nothing more than predictable results. Ans. 22. Without a more thorough technical explanation as to what would actually be achieved by the proposed modification and why a skilled artisan would have had an associated reason for making the modification, this reasoning is deficient. We agree with Appellants that the rejection is in the nature of a “piecemeal reconstruction” of the claimed invention, which was derived from the two references in a manner that is not fairly suggested by those references.

Accordingly, we do not sustain the rejection of claims 1–7 and 9–20 as being unpatentable over Morgan ‘741 and Morgan ‘597.

Claim 8--Obviousness--Morgan ‘741/Morgan ‘597/Avni

The Examiner does not rely on Avni in any manner that cures the deficiencies noted above with respect to the proposed combination of Morgan ‘741 and Morgan ‘597. The rejection of claim 8 is therefore not sustained.

DECISION

The rejection of claims 15–20 under 35 U.S.C. § 101 is reversed.

The rejection of claims 1–7 and 9–20 under § 103(a) in view of Morgan ‘742 and Morgan ‘597 is reversed.

The rejection of claim 8 under § 103(a) in view of Morgan ‘742, Morgan ‘597, and Avni, is reversed.

REVERSED