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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte FERNANDO JOSE ISAZA

Appeal 2019-002927
Application 13/133,194
Technology Center 3700

Before ANTON W. FETTING, MICHAEL C. ASTORINO,
ROBERT J. SILVERMAN, *Administrative Patent Judges*.

ASTORINO, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), the Appellant¹ appeals from the Examiner's decision to reject claims 19–36. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. The Appellant identifies the real party in interest as Koninklijke Philips, N.V. Appeal Br. 3.

STATEMENT OF THE CASE

Subject Matter on Appeal

Claims 19, 25, and 31 are the independent claims on appeal.

Claim 25, reproduced below, is illustrative of the claimed subject matter.

25. A method of determining an elastance and a resistance of the breathing of a subject, the method comprising:

(a) delivering gas to and receiving gas from an airway of a subject to mechanically ventilate the subject;

(b) detecting, with a sensor, the gas being delivered to or received from the airway and generating an output signal that conveys information related to a parameter of the gas being delivered to or received from the airway; and

(c) determining an elastance and a resistance of the subject without the natural ventilation of the subject being adjusted to facilitate the determination, wherein determining the elastance and the resistance of the breathing of the subject comprises:

(1) determining parameters of gas at or near the airway at a detection point in time at which the muscle pressure of the subject and the time derivative of muscle pressure of the subject are at or near zero based on the output signal, and

(2) determining the elastance and the resistance from functions that describe the values of elastance and resistance as a function of the determined parameters of the gas at or near the airway of the subject at the detection point in time, and wherein the functions implemented to determine the values of elastance and resistance correspond to a system of equations in which elastance and resistance are unknown parameters, muscle pressure is assumed to be zero, and the time derivative of muscle pressure is assumed to be zero.

Appeal Br., Claims App.

Rejections

Claims 19–23, 25–29, and 31–35 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to a judicial exception without significantly more.

Claims 19–23, 25–29, and 31–35 are rejected under 35 U.S.C. § 103(a) as unpatentable over Ranieri et al. (US 2008/0234595 A1, pub. Sept. 25, 2008) (“Ranieri”) and Lutchen et al. (US 6,435,182 B1, iss. Aug. 20, 2002) (“Lutchen”).

Claims 24, 30, and 36 are rejected under 35 U.S.C. § 103(a) as unpatentable over Ranieri, Lutchen, and Jafari (US 8,434,480 B2, iss. May 7, 2013) (“Jafari”).

ANALYSIS

Patent-Ineligible Subject Matter

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

The Supreme Court, in *Alice*, reiterated the two-step framework previously set forth in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66 (2012), “for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Alice Corp.*, 573 U.S. at 217. The first step in that analysis is to “determine whether the claims at issue are

directed to one of those patent-ineligible concepts.” *Id.* If the claims are not directed to a patent-ineligible concept, e.g., an abstract idea, the inquiry ends. Otherwise, the inquiry proceeds to the second step where the elements of the claims are considered “individually and ‘as an ordered combination’” to determine whether there are additional elements that “‘transform the nature of the claim’ into a patent-eligible application.” *Id.* (quoting *Mayo*, 566 U.S. at 78, 79). This is “a 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.* at 217–18 (alteration in original).

After the Appellant’s brief was filed, and the Examiner’s Answer mailed, the U.S. Patent and Trademark Office (the “USPTO”) published revised guidance for use by USPTO personnel in evaluating subject matter eligibility under 35 U.S.C. § 101. 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50, 57 (Jan. 7, 2019) (the “2019 Revised Guidance”). That guidance revised the USPTO’s examination procedure with respect to the first step of the *Alice* framework by (1) “[p]roviding groupings of subject matter that [are] considered an abstract idea”; and (2) clarifying that a claim is not “directed to” a judicial exception if the judicial exception is integrated into a practical application of that exception. *Id.* at 50. The 2019 Revised Guidance, by its terms, applies to all applications, and to all patents resulting from applications, filed before, on, or after January 7, 2019. *Id.*²

² The 2019 Revised Guidance supersedes MANUAL OF PATENT EXAMINING PROCEDURE (“MPEP”) § 2106.04(II) and also supersedes all versions of the USPTO’s “Eligibility Quick Reference Sheet Identifying Abstract Ideas.”

We have reviewed the eligibility of the pending claims through the lens of the 2019 Revised Guidance, but we are not persuaded the Examiner erred in concluding that the pending claims are directed to a judicial exception without significantly more.

Step One of the Alice Framework (2019 Revised Guidance, Step 2A)

The Examiner determines that the claims directed to an abstract idea, namely, “the use of the functions to determine resistance and elastance, which more specifically are essentially directed to mathematical algorithms using the functions and equations 11 and 12 in [Appellant’s] specification, and as such, amount to an abstract idea.” Final Act. 5–6. The Appellant disputes the Examiner’s determination. *See* Appeal Br. 7–13.

The first step in the *Alice* framework, as mentioned above, is to determine whether the claims at issue are “directed to” a patent-ineligible concept, e.g., an abstract idea. *Alice Corp.*, 573 U.S. at 217. This first step, as set forth in the 2019 Revised Guidance (i.e., Step 2A), is a two-prong test; in *Step 2A, Prong One*, we look to whether the claim recites a judicial exception, e.g., one of the following three groupings of abstract ideas: (1) mathematical concepts; (2) certain methods of organizing human activity, e.g., fundamental economic principles or practices, commercial or legal interactions; and (3) mental processes. 2019 Revised Guidance,

See 2019 Revised Guidance, 84 Fed. Reg. at 51 (“Eligibility-related guidance issued prior to the Ninth Edition, R-08.2017, of the MPEP (published Jan. 2018) should not be relied upon.”). Accordingly, Appellant’s arguments challenging the sufficiency of the Examiner’s rejection will not be addressed to the extent those arguments are based on currently superseded USPTO guidance.

84 Fed. Reg. at 54. If so, we next consider whether the claim includes additional elements, beyond the judicial exception, that “integrate the [judicial] exception into a practical application,” i.e., that apply, rely on, or use the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the judicial exception (“*Step 2A, Prong Two*”). *Id.* at 54–55. Only if the claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application do we conclude that the claim is “directed to” the judicial exception, e.g., an abstract idea.

The Federal Circuit has explained that “the ‘directed to’ inquiry applies a stage-one filter to claims, considered in light of the specification, based on whether ‘their character as a whole is directed to excluded subject matter.’” *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (quoting *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015)). It asks whether the focus of the claims is on a specific improvement in relevant technology or on a process that itself qualifies as an “abstract idea” for which computers are invoked merely as a tool. *See id.* at 1335–36.

Here, it is clear from the Specification (including the claim language) that the focus of the claim is on an abstract idea. The Specification is entitled “DETERMINING ELASTANCE AND RESISTANCE” and the disclosure “relates to determining the elastance and resistance of the breathing of a subject being ventilated.” Spec. ¶ 1. The Specification describes the invention:

The determination of elastance and resistance of the breathing of subject 12 is made without adjusting the ventilation of subject 12 to facilitate the determination. That is, the

determination of elastance and resistance of the breathing of subject 12 is made without manipulating one or more parameters of the ventilation in a manner not dictated by a treatment algorithm that is designed to ventilate subject 12 effectively and/or comfortably. In conventional ventilation systems, manipulations of one or more ventilation parameters not dictated by a treatment algorithm are commonly made to facilitate a determination of elastance or resistance by creating a certain condition within the ventilation system (e.g., a common pressure with the lungs of subject 12, an imposed pressure oscillation on a therapeutic pressure during inhalation, etc.).

Id. ¶ 16; *see id.* ¶ 24, Abstract. Put simply, the Appellant’s invention determines the elastance and resistance of the breathing of the subject separately from the treatment the patient, i.e., the treatment algorithm is not manipulated. The Specification also describes the collection of data and calculations involved in determining an elastance and a resistance of a breathing subject by using collected data in a set of equations. *See id.* ¶¶ 20–21, 23–38; *see also id.* ¶¶ 43–46. The Specification discloses that the gas pressure at or near the airway of subject 12 (P_a), flow rate of gas (Q) at or near the airway of subject 12, and the volume (V) of gas in the respiratory system of subject 12 are measured by sensors and that muscle pressure (P_m), resistance (R), and elastance (E) are unknowns. *See id.* ¶¶ 20, 23, 25–26. Moreover, the Specification explains that when muscle pressure (P_m) is assigned a value (i.e., assumed to be zero), then equation (1) of the Specification, i.e.,

$$P_m = P_a - (R \cdot Q + E \cdot V)$$

has two unknowns, i.e., resistance (R), and elastance (E), which can be calculated. *See id.* ¶¶ 25–38.

An examination of claim 25 shows that the claim recites: “[a] method of determining an elastance and a resistance of the breathing of a subject, the

method comprising:” (a) delivering gas to and receiving gas from an airway of a subject to mechanically ventilate the subject; (b) detecting the gas being delivered to or received from the airway and generates an output signal that conveys information (i.e., data) related to a parameter of the gas; (c) determining an elastance and a resistance of the subject by (1) determining parameters of gas based on the output signal and (2) determining the elastance and the resistance from a system of equations, i.e.,

(c) determining an elastance and a resistance of the subject without the natural ventilation of the subject being adjusted to facilitate the determination, wherein determining the elastance and the resistance of the breathing of the subject comprises:

(1) determining parameters of gas at or near the airway at a detection point in time at which the muscle pressure of the subject and the time derivative of muscle pressure of the subject are at or near zero based on the output signal, and

(2) determining the elastance and the resistance from functions that describe the values of elastance and resistance as a function of the determined parameters of the gas at or near the airway of the subject at the detection point in time, and wherein the functions implemented to determine the values of elastance and resistance correspond to a system of equations in which elastance and resistance are unknown parameters, muscle pressure is assumed to be zero, and the time derivative of muscle pressure is assumed to be zero.

See Claim 25 supra. In other words, step (a) delivers gas to and receives gas from an airway of a subject and step (b) detects the gas and generates an output signal related to a parameter of the gas. Steps (a) and (b) are steps that yield a collection of data. Step (c) uses the collected data in a set of equations to determine elastance and a resistance of the subject. Notably,

claim 25 does not recite a manipulation of a ventilator's treatment algorithm. *See* Ans. 3 (explaining "the control or adjustment of a ventilator is not actually recited in . . . claim [25]").

When considered collectively and under the broadest reasonable interpretation of the claim's limitations, claim 25 recites a process of collecting data and determining an elastance and a resistance of a breathing subject by using the collected data in a set of equations — i.e., mathematical relationships, mathematical formulas or equations, mathematical calculations — is a concept that falls under the "Mathematical concepts" grouping. 2019 Revised Guidance, 84 Fed. Reg. at 52; *see id.* at n.12 ("*SAP America, Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1163 (Fed. Cir. 2018) (holding that claims to a "series of mathematical calculations based on selected information" are directed to abstract ideas)"). Consequently, under *Step 2A, Prong One*, independent claim 25 recites an abstract idea.

Having concluded that claim 25 recites a judicial exception, i.e., an abstract idea (*Step 2A, Prong One*), we next consider whether the claim recites additional elements that integrate the judicial exception into a practical application (*Step 2A, Prong Two*). 2019 Revised Guidance, 84 Fed. Reg. at 51. When a claim recites a judicial exception and fails to integrate the exception into a practical application, the claim is "directed to" the judicial exception. *Id.*

The additional element recited in claim 25 is the "sensor," which is disclosed in the Specification with a high degree of generality.³ More

³ Independent claim 19 includes as additional elements "a circuit" and "a processor," which are also described in the Specification as generic. *See*

specifically, the sensor is only described by way of its functionality. For example, the Specification describes:

In one embodiment, sensors 20 include one or more sensors configured to monitor one or more parameters of the gas within circuit 14. As such, sensors 20 generate output signals that convey information about the one or more parameters of the gas within circuit 14. The one or more parameters may include one or more of a flow rate, a volume, a pressure, concentrations of one or more molecular species present in the gas, a temperature, a humidity, and/or other parameters. During operation, sensors 20 output one or more output signals that convey information related to the gas parameters monitored by sensors 20.

Spec. ¶ 20. Put simply, the claimed “sensor” is generic. In this case, the additional element in claim 25 does not, individually, integrate the recited abstract idea into a practical application.

The Appellant argues that assuming *arguendo* the claims recite mathematical algorithms/calculations, “the determination of an elastance and a resistance of the breathing of a subject most definitely has a practical application in patients, who are assisted in breathing by a ventilation apparatus.” Appeal Br. 8; *see id.* at 7. The Appellant’s argument is not persuasive. As discussed above, claim 25 recites a process of collecting data and determining an elastance and a resistance of a breathing subject by using the collected data in a set of equations and does not recite a manipulation of a ventilator’s treatment algorithm. Here, claim 25 merely links the abstract idea to a technological environment, i.e., ventilators. *See Affinity Labs of Tex., LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1259 (Fed. Cir. 2016) (“The

Spec. ¶¶ 16, 17, 21–22 (describing gas delivery circuit 14, processor 22); *see also id.* ¶¶ 4, 7, 10, 19, 23, 42.

Supreme Court and [the Federal Circuit] have repeatedly made clear that merely limiting the field of use of the abstract idea to a particular existing technological environment does not render the claims any less abstract.”).

To extent that the Appellant argues that claim 25 does not raise eligibility concerns because the claim includes new, rather than conventional, information by determining parameters of gas at or near the airway of the subject at a detection point in time, which is an improvement to technology or technical field, we disagree. *See* Appeal Br. 8–13 (citing *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014); *Classen Immunotherapies, Inc. v. Biogen IDEC*, 659 F.3d 1057 (Fed. Cir. 2011); *Finjan Inc. v. Blue Coat Systems, Inc.*, 879 F.3d 1299 (Fed. Cir. 2018)). A review of the Specification demonstrates that the claim limitations do not include an improvement in the functioning of a computer, or an improvement to other technology or technical field. *See supra*. And, the claimed features, alone and in combination, are no more than generic components operating in their ordinary capacity. Accordingly, any improvement attributable to claim 25 lies in the abstract idea itself, not to any technological improvement. *See BSG Tech LLC v. BuySeasons, Inc.*, 899 F.3d 1281, 1287–88 (Fed. Cir. 2018). Consequently, under *Step 2A, Prong Two*, the additional element in independent claim 25 does not integrate the abstract idea into a practical application.

The Appellant argues that Examiner’s rejection does not articulate with any specificity to what the claims are directed. *See* Appeal Br. 11 (citing *Thales Visionix Inc. v. United States*, 850 F.3d 1343 (Fed. Cir. 2017)), 13. We disagree. As the Examiner explained in the Final Office Action, that the claims “essentially directed to mathematical

algorithms using the functions and equations 11 and 12 in Applicant’s specification” and that “additional components like . . . the sensor . . . are routine and conventional in the art.” *See* Final Act. 5–7; Ans. 2–4.

Accordingly, claim 25 is directed to an abstract idea.

Step Two of the Alice Framework (2019 Revised Guidance, Step 2B)

In *Step 2B*, we evaluate whether “additional elements recited in the claim[] provide ‘significantly more’ than the recited judicial exception.” *See* 2019 Revised Guidance, 84 Fed. Reg. at 56. More particularly, we evaluate whether these additional elements “add[] a specific limitation or combination of limitations that are not well-understood, routine, conventional activity,” or whether they instead “simply append[] well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.” *Id.* If the additional elements in a claim consist of a conventional arrangement of conventional computer components, they will not amount to significantly more, and the claim fails the *Alice* test for patent eligibility. *Id.*

The “sensor,” the additional element in claim 25, is a detection device that is used to measure a parameter of the gas being delivered to or received from the airway of a subject. The sensor is disclosed in the Specification with a high degree of generality. *See* Spec. ¶ 20. Additionally, as disclosed in the Specification, direct measurements of breathing parameters are performed by generic components, e.g., gas pressure at or near the airway of subject, flow rate of gas at or near the airway of subject, and volume of gas in the respiratory system of subject. *See id.* ¶¶ 20–21, 23. Considering the steps individually, claim 1 lacks additional elements to ensure that the claim

amounts to significantly more. Specifically, the recited steps, understood in light of the Specification, do not appear to require anything other than conventional equipment. *Id.* Considered as an ordered combination, the sensor adds nothing that is not already present when the steps are considered separately.

To extent that the Appellant argues that claim 25 does not raise eligibility concerns because the claim includes “new” (i.e., novel) information by determining parameters of gas at or near the airway of the subject at a detection point in time, we disagree. Appeal Br. 10. An abstract idea is not transformed into an inventive concept just because the prior art does not disclose or suggest it. *See Mayo*, 566 U.S. at 90. “Groundbreaking, innovative, or even brilliant discovery does not by itself satisfy the § 101 inquiry.” *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 591 (2013). Indeed, “[t]he ‘novelty’ of any element or steps in a process, or even of the process itself, is of no relevance in determining whether the subject matter of a claim falls within the § 101 categories of possibly patentable subject matter.” *Diamond v. Diehr*, 450 U.S. 175, 188–89; *see also Mayo*, 566 U.S. at 91 (rejecting “the Government’s invitation to substitute §§ 102, 103, and 112 inquiries for the better established inquiry under § 101”). “It has been clear since *Alice* that a claimed invention’s use of the ineligible concept to which it is directed cannot supply the inventive concept that renders the invention ‘significantly more’ than that ineligible concept.” *BSG Tech*, 899 F.3d 1281, 1290 (Fed. Cir. 2018); *see Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151 (Fed. Cir. 2016) (quoting *Mayo*, 132 S. Ct. at 1304).

Consequently, under *Step 2B*, claim 25, as a whole, with its limitations considered both individually and as ordered combination does not provide significantly more than the recited abstract idea.

Therefore, independent claim 25 fails the *Alice* test for patent eligibility. Thus, we sustain the Examiner's rejection of claim 25. The Appellant does not argue claims 26–29 and 31–35 separately; these claims fall with claim 25. *See* 37 C.F.R. § 41.37(c)(1)(iv).

The Appellant specifically addresses claim 19 and submits that “claim 19 . . . is directed to system configured to determine useful parameters at (different, and thus ongoing) points in time, and to use these parameters to determine variables of a patient during ventilation.” Appeal Br. 11. We appreciate that independent claim 25 is drawn to a method and independent claim 19 is drawn to a system. Appeal Br., Claims App. Independent claim 19 is effectively a system for performing the method of claim 25. Notably, claim 19 includes as additional elements, a “circuit,” “a sensor,” and a “processor,” each of which are described functionally and/or with a high degree of generality and are generic. *See* Spec. ¶¶ 16–17, 20–22 (describing gas delivery circuit 14, sensors 20, and processor 22); *see also CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1375–76 (Fed. Cir. 2011) (citing *In re Abele*, 684 F.2d 902 (CCPA 1982) (“[T]he basic character of a process claim drawn to an abstract idea is not changed by claiming only its performance by computers, or by claiming the process embodied in program instructions on a computer readable medium.”)). Under *Step 2B*, the additional elements, when considered individually and as an ordered combination, do not add significantly more to the abstract idea. Claim 19 does little more than simply instruct the practitioner to implement

the abstract idea of claim 25 by a system, and thus does not transform the abstract idea into a patent-eligible invention. *See Alice*, 573 U.S. at 226–227. Therefore, claim 19 falls for substantially similar reasons as claim 25. The Appellant fails to separately argue claims 20–23, which depends from claim 19; these claims fall with claim 25. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Obviousness based on Ranieri and Lutchen

The Appellant argues that Ranieri fails to disclose “determin[ing] an elastance and a resistance of the breathing of the subject without the natural ventilation of the subject being adjusted to facilitate the determination,” as recited in independent claim 19 and, as similarly recited, in independent claims 25 and 31. Appeal Br. 14–15 (alteration in original) (emphasis omitted). The Appellant submits that Ranieri discloses a method of determining the elastance of the patient’s respiratory system by mechanically preventing air flow during ventilation, i.e., occluding a patient’s breath, at the start of inspiration. *Id.* at 15 (citing Ranieri ¶¶ 8, 13). The Appellant’s argument is not persuasive of error because the Examiner’s rejection relies on the combined teachings of Ranieri and Lutchen to teach the disputed requirements of claims 19, 25, and 31. Final Act. 8.

More specifically, the Examiner finds that Ranieri teaches determining an elastance and a resistance of the breathing of the subject, but fails to specifically disclose doing so without influencing the natural ventilation of the patient to facilitate the determination. *See id.* The Examiner relies on Lutchen to teach determining an elastance and a resistance of the breathing of the subject without influencing the natural

ventilation of the patient to facilitate the determination. *Id.* at 8, 11 (explaining that the Examiner’s rejection relies on Lutchen, and not Ranieri, to teach determining an elastance and a resistance of the breathing of the subject without influencing the natural ventilation of the patient to facilitate the determination). The Examiner finds that “Lutchen teaches a ventilation system that determines elastance and resistance when the muscle pressure is about zero and does not require changing the ventilation parameters.” *Id.* at 8 (citing Lutchen, col. 3, ll. 55–65, col. 8, ll. 27–38, col. 9, ll. 1–19). The Examiner determines that it would have been obvious to one of ordinary skill in the art to use Lutchen’s method of determining elastance and resistance with Ranieri’s method in order to eliminate muscular pressure (P_{mus}). *See id.* (citing Ranieri ¶ 8).

The Appellant argues that Lutchen fails to teach determining elastance and resistance when “muscle pressure is assumed to be zero and the time derivative of muscle pressure is assumed to be zero,” as recited in independent claims 19, 25, and 31. *See* Appeal Br. 14, 16–20. The Appellant submits that “no evidence has been presented to support that ‘relaxed chest wall muscles’ necessarily equates to zero muscle pressure, and zero time derivative of the muscle pressure.” *Id.* at 19. We disagree. In this case, evidence intrinsic to the record, by way of the Specification, supports the Examiner’s position. The Specification explains:

[D]uring expiration, even if the ventilation being provided by system 10 is only assisting the breathing of subject 12, muscle pressure can be assumed to be zero as subject 12 relaxes the respiratory muscles (Spec. ¶ 25);

Muscle pressure can be assumed to be zero at points in time where it is likely that subject 12 is not exerting any effort to breath. For example, in ventilated patients, exhalation is

typically a relaxation of the respiratory muscles. As such, during exhalation muscle pressure may assumed to be zero. As another example, if a patient is not capable of exerting any effort in breathing, muscle pressure may assumed to be zero during inhalation as well as exhalation. Patients incapable of exerting effort in breathing include patients who have been over-supported, patients with extreme and/or degenerative damage to their respiratory systems and/or brain function, patients paralyzed by drugs, and/or other patients. (*Id.* ¶ 28); As will be appreciated, during periods of time where muscle pressure remains at or near zero (e.g., during exhalation, etc.), muscle pressure is constant over time. (*Id.* ¶ 33); and During periods of time where muscle pressure remains at or near zero (e.g., during exhalation, etc.), muscle pressure is constant over time, thus its time derivative is zero (0). (*Id.* ¶ 34).

The foregoing descriptions explain that muscle pressure is assumed to be zero as a subject relaxes respiratory muscles, and when muscle pressure is assumed to be zero, the time derivative of muscle pressure is assumed to be zero.

The Appellant asserts that Lutchen’s “description of chest wall muscles being relaxed does explicitly present a zero muscular pressure, or zero time derivative thereof” because “the term ‘relax their chest muscles’ may easily be a relative state of muscular pressure but not necessarily zero pressure in magnitude or time derivative.” Appeal Br. 17 (citing Lutchen, col. 7, ll. 27–38). However, in light of the Specification, one of ordinary skill in the art may assume muscle pressure to be zero and the time derivative of muscle pressure to be zero when a breathing subject relaxes chest wall muscles (e.g., during expiration).

The Appellant acknowledges Lutchen’s description “that ‘lungs have achieved a near-static mechanical equilibrium with the chest wall[,]’” but

submits that “near static is not static, and thus the time derivative is not zero, nor is the magnitude of the measured quantity necessarily zero.” *Id.* at 20; *see id.* at 16 (citing Lutchen, col. 9, ll. 1–19). The Appellant’s argument is not persuasive of error.

Lutchen describes the moment when expiration ceases and the lungs have achieved a near-static mechanical equilibrium with the chest wall to start its measurements. *See* Lutchen, col. 9, ll. 3–8. Stated otherwise, Lutchen starts its measurement in the pause between breaths where the muscles are relaxed. *See* Ans. 5. The Specification describes, “[m]uscle pressure can be assumed to be zero at points in time where it is likely that subject 12 is not exerting any effort to breath.” Spec. ¶28. Accordingly, in light of the Specification, one of ordinary skill in the art may reasonably assume muscle pressure to be zero in the pause between breaths where the muscles are relaxed, i.e., the moment when expiration ceases and the lungs have achieved a near-static mechanical equilibrium with the chest wall. Additionally, as discussed above, in light of the Specification, one of ordinary skill in the art may assume that during times when muscle pressure is assumed to be zero the time derivative of muscle pressure is assumed to be zero.

Thus, we sustain the Examiner’s rejection of independent claim 19 under 35 U.S.C. § 103 as unpatentable over Ranieri and Lutchen. Dependent claims 20–23, 25–29, and 31–35 fall with claim 19. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Obviousness based on Ranieri, Lutchen, and Jafari

The Appellant does not advance a separate argument for the rejection of claims 24, 30, and 36, which depend from claims 19, 25, and 31, respectively. *See* Appeal Br. 20. We likewise sustain the Examiner’s rejection of claims 24, 30, and 36 under 35 U.S.C. § 103 as unpatentable over Ranieri, Lutchen, and Jafari.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
19–23, 25–29, 31–35	101	Eligibility	19–23, 25–29, 31–35	
19–23, 25–29, 31–35	103(a)	Ranieri, Lutchen	19–23, 25–29, 31–35	
24, 30, 36	103(a)	Ranieri, Lutchen, Jafari	24, 30, 36	
Overall Outcome			19–36	

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

AFFIRMED