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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/630,566	09/28/2012	Chris Vargas	PA22946U;67097-2016PUS1	1012

54549 7590 12/07/2017

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ART UNIT	PAPER NUMBER
1733	

NOTIFICATION DATE	DELIVERY MODE
12/07/2017	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CHRIS VARGAS, ERIC A. HANSEN, RAYMOND C. BENN, DANIEL A. BALES, IVAN M. SCHMIDT, DAVID W. ANDERSON, DAVID ULRICH FURRER, and WILLIAM F. MATZKE

Appeal 2017-000112
Application 13/630,566
Technology Center 1700

Before: ADRIENE LEPIANE HANLON, JEFFREY T. SMITH, and JANE E. INGLESE, *Administrative Patent Judges*.

Opinion for the Board filed by *Administrative Patent Judge* INGLESE.

Opinion Dissenting-in-part filed by *Administrative Patent Judge* HANLON.

INGLESE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants[1] request our review under 35 U.S.C. § 134(a) of a final rejection of claims 1–9 and 21–27. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] Appellants identify United Technologies Corporation as the real party in interest. Appeal Brief filed May 31, 2016 ("App. Br."), 2.

STATEMENT OF THE CASE

Appellants claim a method for adjusting properties of components made of an alloy. App. Br. 2–4. Claim 1 illustrates the subject matter on appeal and is reproduced below:

> 1. A method for adjusting properties of components made of an alloy, the method comprising:
>
> providing historical data for one or more properties of a plurality of components made of an alloy and that are produced at different times over a time period, wherein the plurality of components are solution heat treated at a pre-established solution heat treatment condition and precipitation heat treated;
>
> identifying a trending change in the one or more properties over the time period;
>
> providing test specimens made of the alloy and that differ in shape from the plurality of components;
>
> dividing the test specimens into a plurality of groups and solution heat treating and precipitation heat treating each of the plurality of groups at a different one of a plurality of heat treatment conditions, each of the plurality of heat treatment conditions including a set of at least a solution heat treatment temperature, a heating rate and a cooling rate;
>
> mechanically testing the test specimens after the solution heat treating and precipitation heat treating to provide empirical data;
>
> comparing the empirical data to predetermined performance criteria;
>
> identifying a solution heat treatment condition from the plurality of heat treatment conditions over which the empirical data meets the predetermined performance criteria; and
>
> adjusting a pre-established solution heat treatment temperature, a pre-established heating rate, a pre-established cooling rate, or any combination thereof, of the pre-established solution heat treatment condition for future ones of the plurality of components according to the identified solution heat treatment condition.

App. Br. 13 (Claims Appendix).

The Examiner sets forth the following rejections in the Final Office Action entered November 13, 2015 ("Final Act."), and maintains the rejections in the Answer entered July 28, 2016 ("Ans.")[2]:

I. Claims 1–9 and 21–27 under 35 U.S.C. § 101 for lack of patentable utility as evidenced by Brown et al. (US 3,660,177, issued May 2, 1972); and

II. Claims 1–9 and 21–27 under 35 U.S.C. § 103(a) as unpatentable over Lvova, et al., *Influence of Service-Induced Microstructural Changes on the Aging Kinetics of Rejuvenated Ni-Based Superalloy Gas Turbine Blades*, 10 J. MATERIALS ENGINEERING AND PERFORMANCE 299 (2001), in view of Steven, et al., *Microstructural Changes Which Occur During Isochronal Heat Treatment of the Nickel-Base Superalloy IN-738*, 13 J. MATERIALS SCIENCE 367 (1978).

DISCUSSION

Upon consideration of the evidence relied-upon in this appeal and each of Appellants' contentions, we affirm the Examiner's rejection of claims 1–9 and 21–27 under 35 U.S.C. § 101, and rejection of claims 1–9 under 35 U.S.C. § 103(a), for the reasons set forth in the Final Action, the Answer, and below.

Rejection I

The Examiner determines that claim 1 is directed to the abstract idea of adjusting the properties of components made of an alloy based on an analysis of the properties of previously made components using historical

[2] The Examiner withdrew the rejection of claims 21–27 under 35 U.S.C. § 112, second paragraph, and the rejection of claims 21–26 under 35 U.S.C. § 112, fourth paragraph, in the Answer. Ans. 9.

data, identifying a trending change in properties of components, comparing data, and adjusting conditions used for treating future components. Ans. 10. The Examiner further determines that the additional steps recited in claim 1 of providing test specimens, dividing the specimens, mechanical testing, solution heat treating, and precipitation heat treating, do not add significantly more to the abstract idea, because the steps are conventional and routine in the art. Ans. 10–11. The Examiner determines that claim 1 is, therefore, ineligible for patent patenting. *Id.*

Appellants argue that the Examiner "fails to set forth in full the proper multi-step analysis to determine whether a claim is patent eligible." App. Br. 5. Appellants contend that the Examiner's analysis fails to establish that "the identified feature" is an abstract idea, and Appellants assert that "the identified feature is not any of a fundamental economic principle, an idea of itself, a method of organizing human activity, or a mathematical relationship/formula." App. Br. 5–6.

The Court in *Alice Corp. Pty. Ltd. v. CLS Bank International*, 134 S. Ct. 2347 (2014) identifies a two-step framework for determining whether claimed subject matter is judicially-excepted from patent eligibility under § 101. In the first step, "[w]e must [] determine whether the claims at issue are directed to a patent-ineligible concept," such as an abstract idea. *Alice*, 134 S. Ct. at 2355. Step two involves "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,'" and is more than "well-understood, routine, conventional activity." *Alice*, 134 S. Ct. at 2355 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72–73 (2012)).

Claim 1 recites steps generally directed to (1) providing historical data for one or more properties of a plurality of components made of an alloy, (2) identifying a change in one or more of the properties over time, (3) subjecting test specimens made of the alloy to differing heat treatment conditions and mechanically testing the specimens to obtain empirical data, (4) identifying a solution heat treatment condition used during the testing that produced empirical data meeting predetermined performance criteria; and (5) adjusting the solution heat treatment condition of components in the future to that of the identified solution heat treatment condition.

Accordingly, overall, claim 1 is directed to a process for determining appropriate future solution heat treatment conditions to use on components made of an alloy so as to meet predetermined performance criteria. Except for the steps recited in the claim that involve subjecting test specimens to differing heat treatment conditions and mechanically testing the specimens to obtain empirical data, the recited steps of providing historical data, identifying a change in properties over time, identifying a solution heat treatment condition meeting predetermined performance criteria, and adjusting future solution heat treatment conditions, taken individually, are directed to abstract ideas. Merely combining these steps as recited in claim 1 fails to render the combined steps any less abstract. *SmartGene, Inc. v. Advanced Biological Labs., SA*, 555 Fed. Appx. 950, 955 (Fed. Cir. 2014) (comparing new and stored information and using rules to identify options is an abstract idea); *Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1340 (Fed. Cir. 2017) (organizing, displaying, and manipulating data is an abstract idea).

Appellants do not dispute the Examiner's finding that the steps recited

in claim 1 that involve subjecting test specimens to differing heat treatment conditions, and mechanically testing the specimens to obtain empirical data, are conventional and routine steps in the art. *Compare* Ans. 10–11, *with* Reply Br. 2–3. Therefore, these steps do not constitute an inventive concept that transforms the abstract ideas discussed above into a patent-eligible application of the abstract ideas. *See, e.g., Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 715–716 (Fed. Cir. 2014) (holding the claims insufficient to supply an inventive concept because they did not "do significantly more than simply describe [the] abstract method," but rather are simply "conventional steps, specified at a high level of generality") (quoting *Alice*, 134 S.Ct. at 2357). In addition, the limitations recited in the dependent claims, including claims 8, 9, 25, and 26, also fail to transform the abstract ideas into an inventive concept that is more than well-understood, routine, conventional activity. Accordingly, Appellants' arguments are unpersuasive of reversible error in the Examiner's rejection.

Appellants further argue that the steps recited in independent claims 1 and 27 in combination amount to significantly more than the judicial exception because they ensure that when properties drift over time, a correction of the heat treatment conditions is made so that performance criteria are met. App. Br. 6–7; Reply Br. 2.

However, considering the process steps recited in claims 1 and 27 in combination, they recite no more than data collection, comparison, and analysis; conventional and routine steps to generate empirical data; and additional data analysis to determine appropriate adjustments to future heat treatment conditions. The claimed steps in combination, therefore, do not provide an inventive concept amounting to significantly more than a patent

upon an abstract idea itself, as discussed above.

Therefore, Appellants' arguments are unpersuasive of reversible error in the Examiner's rejection of claim 1. We accordingly sustain the Examiner's rejection of claims 1–9 and 21–27 under 35 U.S.C. § 101.

Rejection II

Claims 1, 2, 6–9, and 25–26

Appellants argue claims 1, 2, 6–9, and 25–26 as a group on the basis of claim 1. App. Br. 9–11. Therefore, we select claim 1 as representative, and decide the appeal of Rejection II as to claims 1, 2, 6–9, and 25–26 based on claim 1 alone.

Lvova discloses that gas turbine blades made from Ni-based superalloys experience high temperatures and stresses during use or service, which causes microstructural deterioration of the blades and leads to degradation of mechanical properties (identifying a trending change in properties over a period of time in service). Lvova p. 299. Lvova discloses a method for rejuvenating gas turbine blades made of Ni-based superalloys after a period of time in service to restore the blades' properties to a practically new condition (method for adjusting properties of components made of an alloy). Lvova pp. 299, 308–309.

Lvova discloses cutting test specimens from four gas turbine blades made from Ni-based superalloys having differing compositions after a period of time in service (providing test specimens made of the alloy that differ in shape from the plurality of components). Lvova pp. 299, 301–304. The Examiner finds that because Lvova discloses that three of the four tested turbine blades were made from the same IN-738 alloy, but have different chemical compositions, one of ordinary skill in the art would have

understood that the blades were made from different batches of the alloy, which were produced at different times. Ans. 13; Lvova p. 299. Lvova discloses determining the time to fracture, elongation, and reduction in area of the specimens in their "as received" condition after a period of time in service (providing historical data for one or more properties of a plurality of components made of an alloy that are produced at different times over a time period). Lvova pp. 300, 305.

Lvova discloses subjecting the test specimens to rejuvenation procedures that include hot isostatic pressing, heat treatment specific for the alloy, furnace cooling, and argon quenching at successively lower temperatures. Lvova p. 304. The Examiner finds, and Appellants do not dispute, that these rejuvenation procedures correspond to:

> dividing the test specimens into a plurality of groups and solution heat treating and precipitation heat treating each of the plurality of groups at a different one of a plurality of heat treatment conditions, each of the plurality of heat treatment conditions including a set of at least a solution heat treatment temperature, a heating rate and a cooling rate.

Compare Final Act. 6–7, *with* App. Br. 9–11. Lvova discloses determining the time to fracture, elongation, and reduction in area of the specimens after the rejuvenation treatment (mechanically testing the test specimens after the solution heat treating and precipitation heat treating to provide empirical data). Lvova pp. 305, 308–309. Lvova discloses that rejuvenation successfully restored the material properties of the specimens, including the stress-rupture life, alloy plasticity, and microhardness (comparing the empirical data to predetermined performance criteria, and identifying a solution heat treatment condition from the plurality of heat treatment

conditions over which the empirical data meets the predetermined performance criteria). Lvova pp. 308–309.

The Examiner finds that Lvova does not disclose solution heat treatment and precipitation heat treatment of the Ni-based superalloys before the rejuvenation treatment, and the Examiner relies on Steven for suggesting this feature. Final Act. 7–8. The Examiner finds, and Appellants do not dispute, that Steven discloses solution heat treating and precipitation heat treating IN-738 nickel-base superalloys to produce a uniform microstructure. *Compare* Final Act. 8, *with* App. Br. 9–11; Steven 367. Based on these disclosures, the Examiner finds that one of ordinary skill in the art would have been led to modify the rejuvenation treatment disclosed in Lvova to solution heat treat and precipitation heat treat the nickel base superalloys before the rejuvenation process steps, to provide a uniform microstructure in the superalloys. Final Act. 8.

The Examiner finds that Steven further discloses quenching the nickel-base superalloy in iced brine following solution heat treatment to provide a rate of cooling sufficient to suppress further precipitation of gamma prime (a microstructural feature). Final Act. 8–9; Steven 367. In view of this disclosure, the Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time of Appellants' invention to quench nickel-base superalloy in iced brine following solution heat treatment to prevent further gamma prime precipitation. Final Act. 9; Ans. 14. The Examiner further finds that if one having ordinary skill in the art desired to further precipitate the gamma prime phase, the skilled artisan would not quench in iced brine, and in so doing, would decrease the cooling rate (adjusting a pre-established solution heat treatment temperature, a pre-

established heating rate, a pre-established cooling rate, or any combination thereof, of the pre-established solution heat treatment condition for future ones of the plurality of components according to the identified solution heat treatment condition). *Id.*

Appellants argue that the Examiner fails to properly apply an obvious to try rationale in finding that one of ordinary skill in the art would have understood that the gas turbine blades disclosed in Lvova from which test specimens were cut were produced at different times. App. Br. 9–10. Appellants contend that the Examiner fails to articulate the findings set forth in MPEP § 2143(I)(E) necessary to apply an obvious to try rationale, and Appellants assert that the Examiner's rejection is therefore "conclusory." App. Br. 9. Appellants further argue that one of ordinary skill in the art would not have had a reason to produce the turbine blades disclosed in Lvova at different times because production time "is of no consequence" to Lvova's study. App. Br. 9–10; Reply Br. 3.

As discussed above, the Examiner did not rely on an obvious to try rationale. The Examiner correctly finds that Lvova discloses three tested turbine blades made from the same IN-738 nickel alloy that each have different chemical compositions. Appellants do not explain how IN-738 nickel alloy turbine blades made at the same time could have different chemical compositions. Thus, as also discussed above, one of ordinary skill in the art would have reasonably expected that the blades were made from different batches of the alloy, and thus were produced at different times. Accordingly, regardless of whether the time when Lvova's turbine blades were produced was of consequence to Lvova's study, the preponderance of the evidence relied upon in this appeal supports the Examiner's finding that

one of ordinary skill in the art would have reasonably expected from Lvova's disclosures that the tested nickel alloy blades were produced at different times. Accordingly, Appellants' arguments are unpersuasive of reversible error in the Examiner's rejection.

Appellants further argue that Lvova does not identify a trending change in connection with the time period over which the turbine blades were made. App. Br. 10. Appellants contend that Lvova instead discloses degradation of mechanical properties and stresses in connection with the service life of the blades. *Id.* Appellants further argue that because Lvova discloses degradation of properties from use in service, "it is unclear how one would even be able to distinguish whether a change in properties is due to variation over the time period of which the components were produced rather than due to degradation during service use." Reply Br. 3–4.

However, as discussed above, one of ordinary skill in the art would have reasonably expected that the nickel alloy turbine blades tested in Lvova were produced at different times (over a time period). In addition, as also discussed above, Lvova discloses that microstructural deterioration occurred in the tested turbine blades during a period of time in service, leading to degradation of the blades' mechanical properties. Therefore, although the degradation of mechanical properties occurred during a period of time in service, it nonetheless occurred in blades produced over a time period.

Appellants argue that even if quenching in ice brine as disclosed in Steven is an adjustment, "it is an adjustment according to a desired amount of gamma prime phase, not an adjustment according to the identified solution heat treatment condition," as recited in claim 1. App. Br. 9–11; Reply Br. 4.

However, as discussed above, Steven discloses quenching a nickel-base superalloy in iced brine following solution heat treatment to provide a rate of cooling sufficient to suppress further precipitation of gamma prime. In view of this disclosure, and in view of the Examiner's uncontroverted finding that the rejuvenation procedures disclosed in Lvova include solution heat treatment, one of ordinary skill in the art seeking precipitated gamma prime in a rejuvenated nickel-base superalloy would have modified the rejuvenation process disclosed in Lvova to decrease the cooling rate following hot isostatic pressing and heat treatment (solution heat treatment), corresponding to adjusting a pre-established cooling rate of the pre-established solution heat treatment condition for future ones of the plurality of components according to the identified solution heat treatment condition, as recited in claim 1.

Therefore, Appellants' arguments are unpersuasive of reversible error in the Examiner's rejection of claim 1. We accordingly sustain the Examiner's rejection of claims 1, 2, 6–9, and 25–26 under 35 U.S.C. § 103(a).

Claim 21

Appellants argue that Lvova does not identify a trending change due to variations in the chemical composition of the alloy used to make components as recited in claim 21. App. Br. 10.

However, Lvova's disclosure of Ni-based superalloy turbine blades having differing chemical compositions, and uncontroverted disclosure of identifying a trending change in blade properties occurring during a period of time in service, would have suggested to one of ordinary skill in the art that the change in properties of the blades during service was due to the

chemical composition of the blades, and thus could be attributed at least partially to variations in the chemical compositions of the blades, as recited in claim 21. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (an obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for [an Examiner] can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.")

Accordingly, Appellants' arguments are unpersuasive of reversible error in the Examiner's rejection of claim 21 under 35 U.S.C. § 103(a), and we accordingly sustain the rejection.

Claim 27

Appellants argue that claim 27 recites numerous steps "that are 'in response to the trending change.'" App. Br. 11.

Lvova's disclosure of rejuvenating gas turbine blades having microstructural deterioration and degradation of mechanical properties to restore the blades to an almost new condition reasonably would have suggested to one of ordinary skill in the art that the rejuvenation process was performed in response to the microstructural deterioration and degradation of mechanical properties (in response to the trending change), as recited in claim 27. We accordingly sustain the Examiner's rejection of claim 27 under 35 U.S.C. § 103(a).

Claims 3–5 and 22–24

Appellants argue claims 3–5 and 22–24 as a group. We select claim 3 as representative. Claim 3 depends from claim 1 and recites that the alloy is a nickel-based alloy that has gamma double prime phase, gamma prime phase, and a delta phase, present after the solution heat treating and

precipitation heat treatment.

The Examiner finds that the nickel-based alloy IN-738 disclosed in Lvova includes nickel, titanium, aluminum, niobium, and iron. Ans. 17. The Examiner finds that the ASM Specialty Handbook,[3] made of record with the Answer, discloses that to form γ' phase in heat-resistant superalloys, nickel and titanium and/or aluminum must be present, to form γ" phase, nickel and niobium must be present, and to form δ phase, nickel, iron, and niobium must be present. *Id.* The Examiner finds that the nickel-based alloy IN-738 disclosed in Lvova would thus include γ' phase, γ" phase, and δ phase following solution heat treatment and precipitation heat treatment conducted during rejuvenation, because the alloy includes the elements necessary to form these phases. *Id.*

Appellants argue that "there are a wide variety of heat treatments" that influence microstructure, as evidenced by column 9 of U.S. patent 6,730,264; Lvova pg. 305, section 3; and paragraph 33 of their Specification. App. Br. 11–12. Appellants contend that the "existence of heat treating and the mere commonality of being nickel alloy is not enough to support an assumption that the prior art microstructure is necessarily the same as claimed." Reply Br. 4–5.

U.S. patent 6,730,264 describes varying the composition of a nickel alloy to produce numerous test alloys, and indicates that as the quantity of Al + Ti increased in the test alloys, "the quantity of γ'increased." *See* col. 6–col. 9. In addition, the table presented in column 9 of this patent indicates

[3] ASM SPECIALTY HANDBOOK (NICKEL, COBALT, AND THEIR ALLOYS) (JR Davis, Davis & Associates, ASM International Handbook Committee, (2000)).

that all of the test alloys were subjected to the same heat treatment conditions. Therefore, the portion of U.S. patent 6,730,264 cited by Appellants indicates that the level of Al + Ti—rather than heat treatment conditions—determines the level of γ' in nickel alloys. With respect to the remaining evidence cited by Appellants, page 305 of Lvova discusses service-induced changes in microstructure of nickel alloys, while paragraph 33 of Appellants' Specification describes the microstructural features of exemplary nickel alloys that are "of interest" for gas turbine components.

Accordingly, the evidence relied-upon by Appellants does not demonstrate that the nickel-based alloy IN-738 disclosed in Lvova would not have gamma double prime phase, gamma prime phase, and delta phase present following solution heat treatment and precipitation heat treatment during rejuvenation (discussed above), as recited in claim 3. Therefore, the preponderance of the evidence relied upon in this appeal supports the Examiner's conclusion of obviousness.

We accordingly sustain the Examiner's rejection of claims 3–5 and 22–24 under 35 U.S.C. § 103(a).

DECISION

We affirm the Examiner's rejection of claims 1–9 and 21–27 under 35 U.S.C. § 101, and rejection of claims 1–9 and 21–27 under 35 U.S.C. § 103(a).

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

AFFIRMED

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CHRIS VARGAS, ERIC A. HANSEN, RAYMOND C. BENN, DANIEL A. BALES, IVAN M. SCHMIDT, DAVID W. ANDERSON, DAVID ULRICH FURRER, and WILLIAM F. MATZKE

Appeal 2017-000112
Application 13/630,566
Technology Center 1700

Before: ADRIENE LEPIANE HANLON, JEFFREY T. SMITH, and JANE E. INGLESE, *Administrative Patent Judges*.

Opinion Dissenting-in-part filed by HANLON, *Administrative Patent Judge*.

I respectfully dissent from the portion of the majority's decision affirming the § 101 rejection of claims 1–9 and 21–27.

Independent claims 1 and 27 recite in relevant part:

> A method for adjusting properties of components made of an alloy, the method comprising: . . .
>
> providing test specimens made of the alloy and that differ in shape from the plurality of components;
>
> dividing the test specimens into a plurality of groups and solution heat treating and precipitation heat treating each of the plurality of groups at a different one of a plurality of heat treatment conditions, each of the plurality of heat treatment conditions including a set of at least a solution heat treatment temperature, a heating rate and a cooling rate;

> mechanically testing the test specimens after the solution heat treating and precipitation heat treating to provide empirical data . . . .

App. Br. 13, 16.

As explained by the majority, the Supreme Court in *Alice* identifies a two-step framework for determining whether claimed subject matter is judicially-excepted from patent eligibility under § 101. According to the first step, "[w]e must [] determine whether the claims at issue are directed to a patent-ineligible concept," such as an abstract idea. *Alice*, 134 S. Ct. at 2355.

As for the first step, the Examiner finds the claims on appeal are directed to an abstract idea. Ans. 2–3. The Examiner finds the abstract idea is "adjusting only the pre-established solution heat treatment temperature, the heating rate, the cooling rate or a combination thereof based upon the analysis of previously produced components." Ans. 3. The Examiner bases that finding on the fact that "there are some intangible steps such as providing historical data, identifying trending changes, comparing data, etc." and some "tangible steps such as solution heat treating and precipitation heat treating" which "are specified at a high level of generality and are well known conventional steps in the processing of alloys." Ans. 3.

The Appellants argue that the "high level of generality" referred to by the Examiner is associated with the second step in the *Alice* framework, not the first step. App. Br. 5. I agree. In particular, the Supreme Court states that step two involves "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,'" and is more than "well-understood, routine,

conventional activity." *Alice*, 134 S. Ct. at 2355 (quoting *Mayo*, 566 U.S. at 72–73); *see also Ultramercial*, 772 F.3d at 715 (stating that a sequence of steps comprising "only 'conventional steps, specified at a high level of generality' . . . is insufficient to supply an 'inventive concept'"). Thus, in my opinion, the Examiner has failed to establish, in the first instance, that the claimed method is directed to an abstract idea.

Moreover, assuming for the sake of argument that the claimed method is directed to an abstract idea, the Examiner, in my opinion, has failed to adequately address the second step in the *Alice* framework. In that regard, the Examiner finds that the tangible steps of solution heat treating and precipitation heat treating "are specified at a high level of generality and are well known conventional steps in the processing of alloys." Ans. 3. Claims 1 and 27, however, are not limited to the general steps identified by the Examiner (i.e., providing test specimens, dividing the test specimens, solution heat treating, precipitation heat treating, and mechanical testing). *See* Ans. 10. Rather, claims 1 and 27 recite, *inter alia*, the steps of (1) dividing the test specimens into a plurality of groups, (2) solution heat treating and precipitation heat treating each group *at different heat treatment conditions*, which include *a solution heat treatment temperature, a heating rate, and a cooling rate*, and (3) mechanically testing the test specimens after solution heat treating and precipitation heat treating. *See* App. Br. 13, 16.

In my opinion, the Examiner has failed to establish, in the first instance, that the combination of steps (1)–(3), and step (2) in particular, is "routine, conventional activity." *Ultramercial*, 772 F.3d at 715; *see also* App. Br. 7 (arguing that "the claims improve upon heat treatment technology

by correcting a heat treatment that has drifted off course with respect to the performance criteria").

For the reasons set forth above, I would not sustain the § 101 rejection on appeal.