UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/085,966	04/13/2011	Kei YAMAZAKI	378175US41	3163

22850 7590 02/04/2019

OBLON, MCCLELLAND, MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER
WARD, THOMAS JOHN

ART UNIT	PAPER NUMBER
3761	

NOTIFICATION DATE	DELIVERY MODE
02/04/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
OBLONPAT@OBLON.COM
iahmadi@oblon.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte KEI YAMAZAKI, REIICHI SUZUKI, and YIMIN YUAN

Appeal 2017-004892
Application 13/085,966
Technology Center 3700

Before JENNIFER D. BAHR, WILLIAM A. CAPP, and JILL D. HILL, *Administrative Patent Judges*.

CAPP, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants seek our review under 35 U.S.C. § 134(a) of the final rejection of claims 1, 2, 4–9, and 11. We have jurisdiction under 35 U.S.C. § 6(b).[1]

We AFFIRM-IN-PART.

---

[1] This matter came before the Board for regularly scheduled oral hearing January 16, 2018. Citations to the hearing transcript are preceded by the abbreviation "Tr."

THE INVENTION

Appellants' invention relates to arc welding. Spec. 1. Claim 1, reproduced below, is illustrative of the subject matter on appeal.

> 1. A method for high-current-density gas-shielded arc welding, the method comprising:
>
> performing pulsed arc welding with a flux-cored wire as an electrode wire, and the flux-cored wire comprises
>
> a steel sheath; and
>
> a flux filled in the sheath, and
>
> the flux-cored wire has a flux filling rate of 10 to 25 percent by mass based on the total mass of the wire and contains carbon (C) in a content of 0.08 percent by mass or less, silicon (Si) in a content of 0.5 to 1.5 percent by mass, manganese (Mn) in a content of 1.5 to 2.5 percent by mass, and titanium (Ti) in a content of 0.1 to 0.3 percent by mass,
>
> wherein the pulsed arc welding is carried out by passing a pulsed current so that a pulse peak current density during a pulse peak time Tp is 400 to 950 A/mm^2, a pulse base current density during a pulse base time Tb is 200 A/mm^2 or more and differs from the pulse peak current density by 200 to 400 A/mm^2, and an average current density is 350 to 750 A/mm^2, and
>
> wherein the average current density is calculated by dividing an average of the pulsed current during the pulsed arc welding by a sectional area of a current path in the flux-cored wire.

THE REJECTIONS

The Examiner relies upon the following as evidence in support of the rejections:

Gordish	US 5,233,160	Aug. 3, 1993
Gault	US 6,303,891 B1	Oct. 16, 2001
Arakawa	US 2005/0269296 A1	Dec. 8, 2005
Hartman	US 2007/0181549 Al	Aug. 9, 2007
Koshiishi	US 2007/0210048 Al	Sept. 13, 2007

The following rejections are before us for review:

1. Claims 1, 4, 5, 6, and 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Koshiishi, Hartman, and Arakawa.

2. Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Koshiishi, Hartman, Arakawa, and Gault.

3. Claims 7–9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Koshiishi, Hartman, Arakawa, and Gordish.

OPINION

Unpatentability of Claims 1, 4, 5, 6, and 11 over Koshiishi, Hartman, and Arakawa

Claim 1

The Examiner finds that Koshiishi discloses a pulsed arc welding method as claimed, except for using a steel sheathed, flux-cored welding wire that is filled as claimed. Final Action 3–4. The Examiner relies on Hartman as disclosing a steel sheathed, flux-cored electrode with a flux fill composition in the range of 12–30 percent of the electrode weight and with constituent concentrations of carbon, silicon, manganese, and titanium, each within the claimed range. *Id.* at 4. The Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method of Koshiishi with a steel sheathed electrode as taught by Hartman. *Id.* According to the Examiner, a person of ordinary skill in the art would have done this to provide a weld with improved yield strength, tensile strength, and impact toughness. *Id.*

Appellants' first argument is that the Examiner cited to the wrong paragraphs in Koshiishi for disclosure of welding current. Appeal Br. 5. This argument is not persuasive. In their Appeal Brief, Appellants admit

that Koshiishi discloses the welding current parameters recited in the Final Action, albeit in paragraph 36 instead of paragraphs 14 and 15. *Id.* at 6. We further note that welding current parameters are disclosed in the Abstract of Koshiishi, which appears on the first page of the patent publication. Koshiishi, Abstract, *see also* ¶ 18.

We fail to see how Appellants have been prejudiced by the Examiner's typographical error with respect to paragraph citations in Koshiishi. Under the facts and circumstances attendant to this case, the Examiner's incorrect paragraph citation does not rise to the level of reversible error.

Next, Appellants argue that the applied art fails to disclose the final limitation of claim 1, namely:

> wherein the average current density is calculated by dividing an average of the pulsed current during the pulsed arc welding by a sectional area of a current path in the flux-cored wire.

Appeal Br. 10, Claims App., claim 1. This argument is not persuasive. The above quoted limitation is definitional in nature. In other words, it merely informs a person of ordinary skill in the art how to perform the calculation that leads to average current density. Thus, as long as the applied art discloses an average current that, when divided by a sectional area of a current path, yields an average current density within the claimed range, the claim is satisfied. In the instant case, Koshiishi discloses both peak and base current and time durations. Koshiishi, Abstract, ¶¶ 18, 36, and 36. This is sufficient to calculate an average current. Koshiishi and Hartman each disclose information that relates to a sectional area of a current path of a flux-cored wire. Koshiishi ¶¶ 78, 82, 100, 122, and 140; Hartman ¶¶ 29, 33,

34, and 50. It is not necessary that the references explicitly disclose the claimed formula. It is sufficient that they disclose the underlying data from which the necessary calculations can be performed using the claimed formula. To clarify, we do not construe the claim language as reciting a positive step of performing the calculation.

Next, Appellants fault the Examiner for relying on Arakawa in the rejection of claim 1. Appeal Br. 9–10. Appellants argue that Arakawa relates to machining currents, not welding currents. *Id.* This argument fails to apprise us of Examiner error. The Examiner's first ground of rejection groups claims 1, 4, 5, 6, and 11 together as unpatentable over three references. Final Action 3–5. However, the Examiner's findings of fact with respect to the rejection of claim 1 relies only on Koshiishi and Hartman. *Id.* 3–4. Arakawa appears to be relied on only as to claims 4, 5, and 11, and for providing calculations and control operations that are not claimed in claim 1. *Id.* at 5. Again, we do not construe the claim language to require a positive step of performing the calculation.[2]

Next, Appellants criticize the Examiner for relying on a statement of law regarding intended use that is allegedly only applicable to apparatus claims and, therefore, is not applicable to the instant method claims. Appeal Br. 10–11. Appellants are technically correct about the statement of law regarding intended use. *See ParkerVision, Inc. v. Qualcomm Inc.*, 903 F.3d 1354, 1363 (2018). However, even if this point is conceded to Appellants, it fails to apprise us of reversible error. Koshiishi is directed to a method for performing pulsed arc welding. Koshiishi, Abstract. The issue presented on

[2] Appellants concede that claim 1 does not require a controller. Tr. 10:5–6; 17:1-3.

appeal is whether a person of ordinary skill in the art would have found it obvious to use the flux-cored wire of Hartman in the method of Koshiishi. The Examiner finds that a person of ordinary skill would have had a reason to combine Koshiishi and Hartman in a manner that achieves the claimed method. Final Action 4. This is sufficient to satisfy the requirements of *ParkerVision* pertaining to obviousness of a method claim. *ParkerVision*, 903 F.3d at 1363.

Finally, Appellants take the Examiner to task for failing to make sufficient findings of fact with respect to the sectional area of the current path of the weld wire. Appeal Br. 8, Reply Br. 6. Appellants' Specification defines current density as current value divided by the sectional area of the current path in the wire. Spec. 9. The Specification then explains why flux-cored wire is used in the invention. *Id.* 9–11. The Specification then explains that the flux core of the welding wire "does not substantially allow a current to pass therethrough and therefore a high current passes mainly through the steel sheath. *Id.* 11–12. Thus, we agree with Appellants that "sectional area of the current path" should exclude the sectional area of the flux core.

The Specification is replete with references to various current densities. *Id.* 4, 5, 10, 12, 13, 14, 17, 18, 22, and 26. However, although claim 1 recites that current density is determined by dividing average current by sectional area, the Specification is silent as to: (1) the average current; and (2) the sectional area, which are the two parameters that are used to calculate such density. *See generally* Spec.[3] The Specification teaches that,

[3] The Specification discloses the diameter of the weld-wire in three places. *Id.* 19, 22, and 26 (disclosing diameters from 1.2 to 1.6 mm). However, it is clear from the surrounding context that the Specification is referring to

in a preferred embodiment, the flux-cored wire used in the invention has a flux filling rate of 10 to 25 percent mass. *Id.* 16. Otherwise, the Specification teaches that:

> The flux-cored wire for use in the present invention is not limited in its conditions or parameters such as chemical composition, material of the steel sheath, ratio of the cross-sectional area of the steel sheath to the total cross-sectional area of the wire, wire cross-sectional shape, wire diameter, and filling rate of the flux.

Id. 15–16.

We turn now to the applied art. Koshiishi discloses the use of weld wire in the range of 1.0 to 1.6 mm in diameter. Koshiishi ¶ 78. Specific examples are given using a wire diameter of 1.2 mm. *Id.* ¶¶ 82, 100, 122. For purposes of the rejection, the Examiner modifies Koshiishi's solid wire, which is 1.0 to 1.6 mm in diameter, with the teachings of Hartman to yield a flux-cored weld wire with a sectional area of 1 mm^2. Final Action 3. Appellants argue that the Examiner fails to explain how Koshiishi's teaching of 1.0 to 1.6 mm wire yields a sectional area of 1 mm^2. Reply Br. 6. However, this argument overlooks the fact that the Examiner's rejection is based on modifying Koshiishi with the teachings of Hartman. *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (explaining that non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references). Consequently, in an obviousness analysis, "we do not ignore the modifications that one skilled in the art would make to a device

---

diameter of the entire weld wire as opposed to a section thereof that excludes the flux core.

borrowed from the prior art." *In re Icon Health & Fitness, Inc.*, 496 F.3d 1374, 1382 (Fed. Cir. 2007).

The cross-sectional area of circular wire ranging from 1.0 to 1.6 mm in diameter yields a range of about 0.8 to 2.0 mm^2 or, in other words, a range that extends from less than to greater than 1 mm^2. The sectional area of a sheath of flux-cored wire such as taught by Hartman would, of course, be less than the cross-sectional area of solid wire of equal diameter.[4] Appellants present neither evidence nor persuasive technical reasoning that presents a serious challenge to the conclusion that a Hartman flux-cored weld wire will have a current path sectional area of 1 mm^2 somewhere within the range of total wire diameter taught by Koshiishi. Although Appellants complain that the Examiner did not provide a detailed explanation or computation as to how the 1 mm^2 figure in the rejection was arrived at, we are mindful that: (1) Appellants' own Specification teaches that the flux-cored wire of the present invention is not limited by its ratio of the cross-sectional area of the sheath to the total cross-sectional area of the wire; and (2) Appellants do not explicitly disclose the current path sectional area of the wire disclosed in their Specification.[5] Spec. 15–16. Here, the

---

[4] We are mindful that sectional areas other than 1 mm^2 may be used to calculate current densities within the claimed range. We use the sectional area of 1 mm^2 herein for exemplary purposes, for ease of calculation, and because the Examiner relied on this parameter in the final rejection. Furthermore, we are mindful that Hartman discloses a fill rate of 12–30 percent by weight which provides at least some indication as to the relative size of the flux core vis-à-vis the thickness of the sheath of a Hartman weld wire.

[5] Indeed, the flux-core weld wire used in the examples cited in the Appellants' Specification appears to be a known, off-the-shelf, commodity product. Spec. 21 (identifying the flux-cored wire used in the examples

Examiner's finding of fact that substituting Koshiishi's solid wire with Hartman's flux-cored wire will yield a sectional area current path of 1 mm^2 is supported by a preponderance of the evidence. Appellants' complaints about "how" the Examiner reached such finding does not undermine our determination "that" the Examiner's finding is correct.

At a minimum, the Examiner has established a reasonable basis for believing that the 1 mm^2 current path sectional area is met by the prior art. *See In re Spada*, 911 F.2d 705 (Fed.Cir.1990). This is sufficient to shift the burden of proof to Appellants to demonstrate, with an evidentiary showing, that the Examiner is incorrect. In other words, "when the PTO shows sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *Id.* at 708. Appellants' naked assertions and unsubstantiated attorney argument are insufficient to meet Appellants' burden.

Koshiishi teaches a peak current of 300–700A for a first peak pulse period and a peak current of 200–600A for a second peak pulse period. Koshiishi, ¶ 36(a), (e). This peak current is sufficient to satisfy Appellants' claimed peak current density of 400 to 950 A/mm^2 when used in conjunction with the 1 mm^2 sectional area current path of the Examiner's rejection. Koshiishi then teaches a base current of 30–200A for a first base period and a base current of 30–200A for a second base period. *Id.* ¶ 36((c), (g). Such base current satisfies Appellants' claimed base current density of 200 A/mm^2 (or more) when used in conjunction with the 1 mm^2 sectional area current path of the Examiner's rejection. If we use a first peak pulse current

---

tabulated in Table 1 on page 22 of the Specification as JIS Z3313:1999 YFW-C50DM material). *See* EP 2 179 813 A1, pub. Apr. 4, 2010, ¶ 31.

of 600A or a second peak pulse current of 600A and a base current of 200A from Koshiishi, the difference between Koshiishi's peak current and base current is 400A/mm^2 which satisfies the limitation in claim 1: "and differs from the pulse peak current density by 200 to 400 A/mm^2" using a 1 mm^2 sectional area.

To compute an average current density for Koshiishi using a 1 mm^2 sectional area, we perform a weighted average calculation using the first and second peak and base time periods disclosed in paragraph 36. Koshiishi, ¶ 36. For purposes of illustration, we select the upper end of each pulse period so that the first peak pulse period is 5 ms, the first base period is 10 ms, the second peak pulse period is 15 ms, and the second base period is 20 ms. *Id.* The weighted average calculation yields an average current of 360A which when applied over a sectional area of 1 mm^2 yields an average current density of 360A/mm^2. The Examiner's finding of fact that Koshiishi as modified by Hartman yields the claimed current densities is supported by a preponderance of the evidence.

Appellants' disclose current density, but not current and sectional area, whereas Koshiishi discloses current and wire diameter, but does not calculate current density therefrom. However, the fact that Appellants perform a current density calculation using current and sectional area parameters known in the prior art does not establish the non-obviousness of Appellants' invention. Deriving current density by dividing current by sectional area is a simple straightforward calculation. It is well settled that a claim does not become nonobvious simply because the patent specification provides a more comprehensive explication of the known relationships between the variables and the affected properties. *In re Applied Materials,*

Inc., 692 F.3d 1289, 1297 (Fed. Cir. 2012). Here, as determined after performing the appropriate calculations, the prior art discloses parameters that overlap the ranges in Appellants' claims. *See In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) ("A prima facie case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art").[6]

Appellants do not challenge the Examiner's determination that Koshiishi and Hartman could have been combined in the manner proposed in the rejection using no more than ordinary skill. *See generally* Appeal Br., Reply Br., Final Action 4. When a work is available in a field of endeavor, design incentives and other market forces can prompt variations of it, such that a person of ordinary skill can implement a predictable variation, Section 103 likely bars its patentability. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). Where "a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result." *Id.* Here, Koshiishi shows that it was known to reduce spatter using current densities in the claimed range.[7] Koshiishi ¶ 78. Using

---

[6] Appellants complain about the "massive amount of raw data" that could lead to "infinite numbers of possibilities" in connection with the calculation of average current densities from the ranges of peak and base currents and times disclosed in Koshiishi. Tr. 18:7–19:12. However, as shown herein, only a handful of calculations is needed to demonstrate, by a preponderance of the evidence, that the range of current densities disclosed in Koshiishi, as modified by Hartman, overlaps Appellants' claimed range, thereby demonstrating a prima facie case of obviousness.

[7] Koshiishi discloses a solid wire diameter range of 1.0 to 1.6 mm. Koshiishi ¶ 78. A solid welding wire with a diameter of between 1.1 and 1.2 mm, which falls within the disclosed range of Koshiishi, yields a current

a weld wire from Hartman with a current path sectional area of 1 mm^2 entails no more than a simple substitution of Hartman's wire for Koshiishi's wire using Koshiishi's method while yielding a predictable result. Evidence that current and current path sectional area of flux-cored wire may interact in an unpredictable or unexpected way could render the combination nonobvious, *see KSR*, 550 U.S. at 421, but Appellants fail to show anything unpredictable or unexpected in the interaction of current and current path sectional area of flux-cored wire.

In view of the foregoing discussion, we determine that the Examiner's findings of fact are supported by a preponderance of the evidence and that the Examiner's legal conclusion of unpatentability is well-founded. Accordingly, we sustain the Examiner's unpatentability rejection of claim 1.

Claim 4

Claim 4 depends from claim 1 and adds the limitation: "wherein the pulsed current includes a current waveform with repeating pulse forms that are all identical." Claims App. Koshiishi teaches the use of a first pulse and second pulse, which pulses are alternately repeated. Koshiishi, ¶ 35, Fig. 1. The respective ranges of peak pulse, base pulse, peak period, and base period overlap. *Id.* ¶ 36. For example, a peak pulse of 600A and base pulse of 200A fall within the range of both the first pulse and second pulse. *Id.* Likewise, a pulse period of 5 ms falls within the range of both the first and second peak and base pulses. *Id.* Such currents and periods yield current densities within the claimed range, including an average current density of 400A. *Id.*

---

path sectional area of about 1 mm^2, which, in turn, yields current densities in the claimed range.

Appellants argue that this limitation is not met by Koshiishi. Appeal Br. 12. Appellants' argument amounts to little more than a recitation of the claim limitations and a naked assertion that the limitations are not met by the prior art. Such is insufficient to set forth an argument for patentability. *See* 37 C.F.R. § 41.37; *In re Lovin*, 652 F.3d 1349, 1357 (Fed. Cir. 2011) (Rule 41.37 requires more than recitation of the claim elements and a naked assertion that the elements are not found in the prior art).

We sustain the Examiner's rejection of claim 4.

Claim 5

Appellants do not argue for the separate patentability of claim 5, which depends from claim 1. We sustain the rejection of claim 5. *See* 37 C.F.R. § 41.37(c)(1)(iv) (failure to separately argue claims).

Claim 6

Claim 6 depends from claim 1 and adds the limitation: "wherein the pulse base current density during the pulse base time Tb is more than 200 A/mm^2." Claims App. Koshiishi discloses a base current of 200A. Koshiishi, ¶ 36. Thus, any sectional area current path that is anything less than 1 mm^2 will yield a pulse base current density of more than 200A/mm^2. [8] The Examiner finds that this limitation is met by Koshiishi as modified by Hartman. Final Action 3–4, Ans. 9–10.

In traversing the rejection, Appellants essentially repeat the same argument regarding Koshiishi's cross-sectional shape that we considered and

[8] For example, a sectional area of 0.9999 mm^2 will yield a base current density of "more than 200 A/mm^2." The claim does not require any specific incremental amount above 200 A/mm^2.

found unpersuasive in connection with claim 1 and find equally unpersuasive here. Appeal Br. 12–13.

We sustain the Examiner's rejection of claim 6.

Claim 11

Claim 11 depends from claim 1 and adds the limitation:

> calculating the average of the pulsed current during the pulsed arc welding using the formula Ia=(Ip·Tp + Ib·Tb)/(Tp +Tb), where Ia is the average of the pulsed current, Ip is a pulse peak current, lb is a pulse base current, Tp is a duration of the pulse peak current, and Tb is a duration of the pulse base current.

Claims App. Using the recited formula, the exemplary embodiment of Koshiishi, as modified by Hartman, discussed in connection with claim 1 above, yields an average current density of 360 A/mm^2, thus satisfying the average current density limitation of claims 1.

Appellants argue that Arakawa relates to control of wire electrical discharge machines to perform electrical discharge machining not pulsed arc welding. Appeal Br. 13–14, Reply Br. 5. In response, the Examiner points out that the controller of Arakawa could be used with a welding process. Ans. 10–11. Appellants also argue that Arakawa does not teach calculating an average of the pulsed current during the pulsed arc welding, using the precise formula recited in claim 11.

Arakawa teaches a controller for an electrical discharge machine that calculates average current densities Id, which reflect an average machining current Im divided by workpiece thickness t and machined groove width g. Arakawa ¶ 91. The Examiner does not adequately explain, and it is not immediately apparent, why this teaching would have prompted a person having ordinary skill in the art to calculate the average current density

conducted through the electrode wire in Koshiishi's pulsed arc welding method using the precise formula recited in claim 11.

Appellants' argument is persuasive of error in the rejection. Accordingly, we do not sustain the rejection of claim 11.

Unpatentability of Claim 2
over Koshiishi, Hartman, Arakawa, and Gault

Appellants do not argue for the separate patentability of claim 2, which depends from claim 1. For reasons set forth above in sustaining the rejection of claim 1, we sustain the rejection of claim 2.

Unpatentability of Claims 7–9
over Koshiishi, Hartman, Arakawa, and Gordish

Claim 7

Claim 7 depends from claim 1 and adds the limitation: "wherein the performing pulsed arc welding includes welding at a deposition rate of 150 grams per minute or more." The Examiner finds that Gordish discloses this limitation. Final Action 6–7, Ans. 11–12. The Examiner further finds that the electrode of Gordish can be used with Koshiishi. *Id.* The Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the electrode of Koshiishi as taught by Gordish. *Id.* According to the Examiner, a person of ordinary skill in the art would have done this to increase the repeatability and safety of the process. *Id.*

Appellants argue that Gordish relates to electric arc welding, but does not explicitly teach that it is used in pulsed arc welding. Appeal Br. 15. However, Appellants provide neither evidence nor persuasive technical reasoning that deposition rate is materially affected by using pulsed arc welding as opposed to electric arc welding.

Gordish is directed to a formulation of ingredients in the flux material of a flux-cored welding electrode. Gordish, col. 5, ll. 5–20.

> The electrode comprises low carbon steel sheath with less than 0.07% by weight of the sheath being carbon and a fill material within the sheath, which fill material is essentially free of non-ferrous carbon compounds and contains 0.5–5.0% metallic aluminum powder.

Id. ll. 16–20. Appellants present neither evidence nor persuasive technical reasoning to challenge the Examiner's finding that the teachings of Gordish can be combined with that of Koshiishi and Hartman. *See generally* Appeal Br., Reply Br. In particular, Appellants provide no evidence that the metallic aluminum powder constituent of Gordish could not be successfully combined with the constituent elements of the flux material of Hartman or that making the combination requires more than ordinary skill.

We are not apprised of error and, therefore, sustain the Examiner's rejection of claim 7.

Claim 8

Appellants do not argue for the separate patentability of claim 8. We sustain the rejection of claim 8. 37 C.F.R. § 41.37(c)(1)(iv).

Claim 9

Claim 9 depends from claim 1 and adds the limitation: "wherein the performing pulsed arc welding includes welding by spray transfer." The Examiner finds that Gordish discloses this limitation. Final Action 6–7, Ans. 11–12. The Examiner further finds that the electrode of Gordish can be used with Koshiishi. *Id.* The Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the electrode of Koshiishi as taught by Gordish. *Id.*

According to the Examiner, a person of ordinary skill in the art would have done this to increase the repeatability and safety of the process. *Id.*

Appellants argue that Gordish relates to electric arc welding, but does not explicitly teach that it is used in pulsed arc welding. Appeal Br. 16. Appellants further argue that Gordish is silent as to welding by "spray transfer." *Id.* In response, the Examiner states Gordish teaches that an arc melts the metal sheath 12 before the material is deposited. Ans. 11. The Examiner characterizes such process as "spray transfer." *Id.* citing Gordish, Fig. 1.

The issue with respect to "spray transfer" is largely a matter of claim construction. During examination of a patent application, pending claims are given their broadest reasonable construction consistent with the specification. *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). Under the broadest reasonable interpretation standard, claim terms are given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). During patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed. *See In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989). Construing claims broadly during prosecution is not unfair to the applicant, because the applicant has the opportunity to amend the claims to obtain more precise claim coverage. *Am. Acad. of Sci.*, 367 F.3d at 1364.

Gordish discloses an electrode 10. Gordish, col. 9, l. 65. Gordish further teaches that:

> The electrode has an outer low carbon sheath 12 with particulate interior fill material or core 20. During the welding

> process, electrode 10 is connected to a power supply to deposit molten metal in a weld bead pool 30 by the heat of electric arc or plasma 40. The arc melts metal sheath 12 and melts the material within core 20 before the material is deposited into the weld bead pool 30.

Id. col. 9, l. 65 – col. 10, l. 4.

Appellants direct our attention to page 2, lines 6–15 and Figure 2 of their disclosure as suggesting a sufficiently narrow construction of spray transfer that arguably excludes Gordish. Appeal Br. 16. However, Appellants fail to provide any persuasive argument as to why the Examiner's construction and application of "spray transfer" is unreasonable in light of Appellants' disclosure. Furthermore, Appellants fail to adequately explain how or why their construction satisfies the "broadest reasonable" standard, yet excludes the above quoted teaching of Gordish as relating to something other than spray transfer. Appellants' argument that Gordish is silent regarding explicit use of the term "spray transfer" is not sufficient to persuade us that the Examiner's construction is unreasonable. *See In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009) (a reference need not satisfy an *ipsissimis verbis* test).

We sustain the Examiner's rejection of claim 11.

DECISION

The decision of the Examiner to reject claims 1, 2, and 4–9 is AFFIRMED.

The decision of the Examiner to reject claim 11 is REVERSED.

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-IN-PART