



# 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.
14/730,414	06/04/2015	Mika MURAKAMI	947_179	4231
25191	7590	09/01/2020	EXAMINER	
Burr & Brown, PLLC PO BOX 869 FAYETTEVILLE, NY 13066			ALLEN, JOSHUA L	
			ART UNIT	PAPER NUMBER
			1795	
			NOTIFICATION DATE	DELIVERY MODE
			09/01/2020	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):

tpreston@burrandbrown.com

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

*Ex parte* MIKA MURAKAMI, SUMIKO HORISAKA, and  
HIROKI FUJITA

---

Appeal 2019-005535  
Application 14/730,414  
Technology Center 1700

---

Before ADRIENE LEPIANE HANLON, N. WHITNEY WILSON, and  
MONTÉ T. SQUIRE, *Administrative Patent Judges*.

SQUIRE, *Administrative Patent Judge*.

DECISION ON APPEAL<sup>1</sup>

Appellant<sup>2</sup> appeals under 35 U.S.C. § 134(a) from the Examiner’s decision to finally reject claims 1–6, 8, and 10–12, which are all of the claims pending in this application.<sup>3</sup> We have jurisdiction under 35 U.S.C. § 6(b).

---

<sup>1</sup> This Decision refers to the Specification filed June 4, 2015 (“Spec.”); Final Office Action dated Aug. 28, 2018 (“Final Act.”); Advisory Action dated Dec. 7, 2018 (“Advisory Act.”); Appeal Brief filed Mar. 5, 2019 (“Appeal Br.”); and Examiner’s Answer dated Apr. 9, 2019 (“Ans.”). There is no reply brief.

<sup>2</sup> We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies NGK Insulators, Ltd. as the real party in interest. Appeal Br. 1.

<sup>3</sup> Claims 7 and 9 are canceled. Appeal Br. 18, 19.

We AFFIRM.

### CLAIMED SUBJECT MATTER

The invention relates to a sensor element and a gas sensor. Spec. ¶ 1, Abstract. Claim 1 illustrates the subject matter on appeal and is reproduced below from the Claims Appendix to the Appeal Brief:

1. A sensor element comprising:

a multilayer structure including a plurality of oxygen-ion-conductive solid-electrolyte layers that are stacked one on top of another, and a measurement-object-gas-flowing portion provided in the multilayer structure and from one end of which a measurement-object gas is introduced into the multilayer structure;

a measuring electrode exposed in a space in which the measuring-electrode is set and which is part of the measurement-object-gas-flowing portion;

an outer electrode provided on an outer surface of the multilayer structure; and

***a blocking portion that includes an outer blocking layer covering at least part of a nearest portion that is at a shortest distance from the space in which the measuring-electrode is set among portions of outer surfaces of the multilayer structure where the solid-electrolyte layers are exposed, the outer blocking layer not conducting one or more kinds of substances that contain oxygen, wherein the outer blocking layer is spaced from and does not cover the outer electrode,***

wherein the outer blocking layer has a porosity of 5% or lower, and

wherein the outer blocking layer has a thickness of 1  $\mu\text{m}$  to 30  $\mu\text{m}$ .

Appeal Br. 17 (key disputed claim language italicized and bolded).

## REFERENCES

The Examiner relies on the following prior art references as evidence in rejecting the claims on appeal:

Name	Reference	Date
Nakano et al. ("Nakano")	US 5,419,828	May 30, 1995
Alkemade et al. ("Alkemade")	US 2004/0112765 A1	June 17, 2004
Fujita et al. ("Fujita")	US 2011/0147214 A1	June 23, 2011
Horisaka et al. ("Horisaka")	US 2011/0186431 A1	Aug. 4, 2011
Wakazono <sup>4</sup>	JP 2010-25793 A	Apr. 2, 2010

## REJECTIONS

On appeal, the Examiner maintains (Ans. 3) the following rejections:

1. Claims 1–3 and 11 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Wakazono in view of Nakano ("Rejection 1").

Ans. 3.

2. Claims 4–6 and 8 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Wakazono in view of Nakano, as applied to claim 1 above, and further in view of Alkemade ("Rejection 2"). Ans. 7.

3. Claim 10 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Wakazono in view of Nakano, as applied to claim 1 above, and further in view of Horisaka ("Rejection 3"). Ans. 10.

---

<sup>4</sup> The Examiner refers and cites to the machine translation of Wakazono provided in the record. Ans. 3.

4. Claims 1–3, 11, and 12 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Fujita in view of Wakazono, further in view of Nakano (“Rejection 4”). Ans. 11.

5. Claim 4–6 and 8 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Fujita in view of Wakazono and Nakano, as applied to claim 1 above, and further in view of Alkemade (“Rejection 5”). Ans. 18.

6. Claim 10 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Fujita in view of Wakazono and Nakano, as applied to claim 1 above, and further in view of Horisaka (“Rejection 6”). Ans. 21.

## OPINION

### *Rejection 1*

The Examiner determines that the combination of Wakazono and Nakano suggests a gas sensor element satisfying the limitations of claim 1 and concludes the combination would have rendered the claim obvious. Ans. 3–6. Regarding “a blocking portion that includes an outer blocking layer covering at least part of a nearest portion that is at a shortest distance from the space in which the measuring-electrode is set” recitation of claim 1, the Examiner relies on Wakazono. *Id.* at 4–5. In particular, the Examiner finds that Wakazono’s surface cover portion 30a and insulating layer 11 teach that recitation of the claim. *Id.* at 4–5 (stating “the surface side cover part 30a and the insulating layer 11 are both spaced apart from and do not cover the outer electrode”) (citing Wakazono ¶ 20, Figs. 2, 3). *See also id.* at 4 (stating “both 30a and 11 [are] equivalent to the ‘blocking portion’”).

Appellant argues the Examiner's rejection of claim 1 should be reversed because Wakazono does not teach or suggest "a blocking portion that includes an outer blocking layer covering at least part of a nearest portion that is at a shortest distance from the space in which the measuring-electrode is set," as required by the claim. Appeal Br. 11–12. Appellant contends that, in contrast to the Examiner's rejection, Wakazono's insulating layer 11 and surface-side cover portion 30a do not cover "a nearest portion that is a shortest distance from the space in which the measuring-electrode is set," as claimed. *Id.* at 11. Rather, based on Figure 2 of Wakazono, Appellant argues that because the outer surface of Wakazono's solid electrolyte layer 2c is directly above measuring-electrode 6a and back-side cover portion 30b covers the entire surface of solid electrolyte layer 2c, insulating layer 11 and surface-side cover portion 30a do not cover a nearest portion that is at a shortest distance from the space in which measuring-electrode 6a is set. *Id.* at 11–12 (arguing "the entire outer surface of the solid electrolyte layer (2c), including the shortest direction from the space in which the measurement electrode is set, is covered with the back-side cover portion (30b)").

The weight of the evidence supports Appellant's argument. On the record before us, we are not persuaded the Examiner has established by a preponderance of the evidence that Wakazono teaches or suggests "a blocking portion that includes an outer blocking layer covering at least part of a nearest portion that is at a shortest distance from the space in which the measuring-electrode is set," as recited in the claim. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992) (holding the examiner bears the initial burden of establishing a prima facie case of obviousness).

The portions of Wakazono the Examiner cites and relies upon in the rejection do not teach or suggest that limitation. *See* Wakazono ¶¶ 20, 25, Figs. 2, 3. Although Figure 2 of Wakazono shows surface cover portion 30a and insulating layer 11 spaced apart from measuring-electrode 6a, it does not show or suggest that surface cover portion 30a and insulating layer 11 cover “a nearest portion that is at a shortest distance from the space in which the measuring-electrode is set,” as required by the claim. Rather, as Appellant explains (Appeal Br. 11–12), because the outer surface of Wakazono’s solid electrolyte layer 2c is directly above measuring-electrode 6a and back-side cover portion 30b covers the entire surface of solid electrolyte layer 2c, neither surface cover portion 30a nor insulation layer 11 would appear to be the nearest portion that is the shortest distance from the space in which measuring-electrode 6a is set.

The Examiner also does not identify sufficient evidence or persuasively explain why one of ordinary skill would have had reason to modify Wakazono’s sensor element to include “an outer blocking layer covering at least part of a nearest portion that is at a shortest distance from the space in which the measuring-electrode is set,” as claimed. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (requiring “reasoning with some rational underpinning to support the legal conclusion of obviousness”) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

Although the Examiner contends that because “the surface-side **cover** portion 30a, the insulating layer 11, and the back-side **cover** portion 30b all serve the purpose of covering the solid electrolyte layer 2c . . . the surface-side cover portion 30a and insulating layer 11 meet the limitation covering the ‘nearest portion’” (Ans. 25), the Examiner has not provided the

requisite factual basis and/or technical reasoning to support such finding. *KSR*, 550 U.S. at 418.

Contrary to what the Examiner's rejection seems to imply, the fact that it may have been technically possible to modify Wakazono's sensor element to include an outer blocking layer covering *a nearest portion that is at a shortest distance* from the space in which the measuring-electrode is set, without more, does not necessarily mean or suggest it would have been obvious to one of ordinary skill in the art to do so. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”).

We, therefore, do not sustain the Examiner's rejection of claim 1. Because claims 2, 3, and 11 depend from claim 1, we also do not sustain the Examiner's rejection of those claims.

Accordingly, we reverse the Examiner's rejection of claims 1–3 and 11 under pre-AIA 35 U.S.C. § 103(a) as obvious over Wakazono and Nakano.

#### *Rejections 2 and 3*

The Examiner rejects dependent claims 4–6 and 8 under § 103 as obvious over Wakazono, Nakano, and Alkemade (Rejection 2) and dependent claim 10 under § 103 as obvious over Wakazono, Nakano, and Horisaka (Rejection 3). Ans. 7–11. The foregoing deficiencies, however, in the Examiner's analysis and findings regarding claim 1 and the Wakazono reference in Rejection 1 are not remedied by the Examiner's findings



regarding the additional references and combination of references the Examiner cites in support of the second and third grounds of rejection.

Thus, for principally the same reasons we discuss above for reversing the Examiner's Rejection 1, we reverse the Examiner's rejections of claims 4–6 and 8 under pre-AIA 35 U.S.C. § 103(a) as obvious over Wakazono, Nakano, and Alkemade (Rejection 2) and claim 10 under pre-AIA 35 U.S.C. § 103(a) as obvious over Wakazono, Nakano, and Horisaka (Rejection 3).

#### *Rejection 4*

The Examiner rejects claims 1–3, 11, and 12 under 35 U.S.C. § 103(a) as obvious over the combination of Fujita, Wakazono, and Nakano. Ans. 11–18. In response to the Examiner's rejection, Appellant presents argument for the patentability of claims 1–3, 11, and 12 as a group. Appeal Br. 14–15. We select claim 1 as representative and claims 2, 3, 11, and 12 stand or fall with claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner determines that the combination of Fujita, Wakazono, and Nakano suggests a gas sensor element satisfying the limitations of claim 1 and concludes the combination would have rendered the claim obvious. Ans. 11–14. On the record before us, we determine a preponderance of the evidence and sound technical reasoning support the Examiner's findings regarding the teachings of Fujita, Wakazono, and Nakano and conclusion that the combination would have rendered the sensor element of claim 1 obvious. Fujita ¶¶ 10, 29, 39, 55, 104, Figs. 1, 5–7; Wakazono, Abstract, ¶¶ 5, 25, Fig. 2; Nakano 7:23–31, 10:6–9, Figs. 2, 4, 5.

Appellant argues principally that the Examiner's rejection of claim 1 should be reversed because the combination of Fujita, Wakazono, and Nakano does not teach or suggest the claimed “outer blocking layer.”

Appeal Br. 14 (arguing “the combination would not have resulted in a sensor element that includes the claimed outer blocking layer”). Relying on essentially the same argument Appellant presents above in response to the Examiner’s rejection based on the combination of Wakazono and Nakano (Rejection 1), Appellant contends

the insulating layer (11) and surface-side cover portion (30a) of Wakazono ‘793, would not have been formed on an exposed outer surface of the solid electrolyte layer (6) to cover a nearest portion that is a shortest distance from the space in which the measurement electrode (44) is set. Therefore, the Examiner’s asserted combination of Fujita and Wakazono ‘793 would not have resulted in a sensor element that includes the claimed outer blocking layer.

*Id.* at 15.

We do not find Appellant’s argument persuasive of reversible error in the Examiner’s rejection because it is premised on what Appellant contends Wakazono teaches individually, and not the combined teachings of the cited prior art references as a whole, and what the combined teachings of the references would have suggested to one of ordinary skill in the art. One cannot show non-obviousness by attacking references individually where the rejection is based on a combination of references. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Appellant’s argument is misplaced because, unlike the Examiner’s rejection above based on the combination of Wakazono and Nakano (Rejection 1), in this rejection, which is based on the combination of Fujita, Wakazono, and Nakano, the Examiner does not rely upon Wakazono for teaching or suggesting “an outer blocking layer covering at least part of a nearest portion that is at a shortest distance from the space in which the measuring-electrode is set” recitation of the claim. Rather, the Examiner

relies on Fujita for teaching that language of the claim. In particular, as the Examiner finds (Ans. 12), Fujita teaches a blocking portion that includes an outer blocking layer covering at least part of a nearest portion that is at a shortest distance from the space in which the measuring electrode is set among portions of outer surfaces of the multilayer structure where the solid-electrolyte layers are exposed, i.e., porous protection layer 90 provided on second solid electrolyte layer 6 and outside pump electrode 23, which a preponderance of the evidence supports. Fujita ¶¶ 39, 104, Figs. 5–7.

As the Examiner further finds and explains (Ans. 12–13), because Fujita is silent as to whether the outer blocking layer it describes blocks substances that contain oxygen, the Examiner relies on Wakazono for teaching the “not conducting one or more kinds of substances that contain oxygen” recitation of the claim. Wakazono, Abstract, ¶¶ 5, 25. The Examiner also relies on Wakazono for teaching the recitation “wherein the outer blocking layer is spaced from and does not cover the outer electrode.” *Id.* at Abstract, Fig. 2. Although the Examiner relies on Wakazono for teaching those particular elements of the claimed outer blocking layer, the Examiner does not rely on Wakazono for teaching or suggesting the “nearest portion that is at a shortest distance from the space in which the measuring-electrode is set” recitation of the claim, as Appellant argues.

The Examiner also provides a reasonable basis, which a preponderance of the evidence in the record supports, to evince why one of ordinary skill would have combined the teachings of Fujita and Wakazono to arrive at the claimed blocking portion. Ans. 13 (explaining that one of ordinary skill in the art would have had reason to modify Fujita’s porous protection layer 90 to include Wakazono’s insulating layer structure to

reduce warping of the sensor element); *see also KSR*, 550 U.S. at 420 (explaining that any need or problem known in the art can provide a reason for combining the elements in the manner claimed).

Appellant's arguments do not reveal reversible error in the Examiner's factual findings or analysis in this regard. Appellant's assertions that the "sensor element of Fujita is essentially the same as the sensor element shown in Fig. 10 of the present application" and "Fujita fails to recognize that electrode-less migration of oxygen ion occurs in the sensor element" (Appeal Br. 14) are not persuasive because they are conclusory and unsupported by persuasive evidence in the record. Attorney argument is not evidence. *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984); *see also In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997) (explaining that mere lawyer's arguments or conclusory statements, which are unsupported by concrete factual evidence, are entitled to little probative value). Appellant's comments in this regard are also not particularly persuasive because the fact that Appellant may have "recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the difference would otherwise [have been] obvious." *Ex parte Obiaya*, 227 USPQ 58, 60 (BPAI 1985).

Accordingly, we affirm the Examiner's rejection of claims 1–3, 11, and 12 under pre-AIA 35 U.S.C. § 103(a) as obvious over Fujita, Wakazono, and Nakano.

#### *Rejections 5 and 6*

In response to the Examiner's rejections of claims 4–6 and 8 under § 103 as obvious over Fujita, Wakazono, Nakano, and Alkemade (Rejection 5) and claim 10 under § 103 as obvious over Fujita, Wakazono, Nakano, and

Horisaka (Rejection 6) (Ans. 18–22), Appellant does not present any additional substantive arguments. Rather, Appellant relies on the same arguments previously discussed and presented above in response to the Examiner’s rejection of claims 1 under § 103 as obvious over Fujita, Wakazono, and Nakano (Rejection 4). *See* Appeal Br. 16.

Thus, based on the fact-finding and reasoning provided by the Examiner, and for principally the same reasons discussed above for affirming the Examiner’s Rejection 4, we affirm the Examiner’s rejections of claims 4–6 and 8 under pre-AIA 35 U.S.C. § 103(a) as obvious over Fujita, Wakazono, Nakano, and Alkemade (Rejection 5) and claim 10 under pre-AIA 35 U.S.C. § 103(a) as obvious over Fujita, Wakazono, Nakano, and Horisaka (Rejection 6).

CONCLUSION

In summary:

<b>Claim(s) Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1-3, 11	103(a)	Wakazono, Nakano		1-3, 11
4-6, 8	103(a)	Wakazono, Nakano, Alkemade		4-6, 8
10	103(a)	Wakazono, Nakano, Horisaka		10
1-3, 11, 12	103(a)	Fujita, Wakazono, Nakano	1-3, 11, 12	
4-6, 8	103(a)	Fujita, Wakazono, Nakano, Alkemade	4-6, 8	
10	103(a)	Fujita, Wakazono, Nakano, Horisaka	10	
<b>Overall Outcome</b>			1-6, 8, 10-12	

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