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ROBERT S. GREEN OERLIKON METCO (US) INC. 1101 PROSPECT AVENUE WESTBURY, NY 11590			CROWELL, ANNA M	
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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* MALKO GINDRAT,  
PHILIPPE GUITTIENNE, and CHRISTOPH HOLLENSTEIN

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Appeal 2019-003872  
Application 13/147,724  
Technology Center 1700

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Before MICHAEL P. COLAIANNI, GEORGE C. BEST, and  
DEBRA L. DENNETT, *Administrative Patent Judges*.

DENNETT, *Administrative Patent Judge*.

DECISION ON APPEAL<sup>1</sup>

Pursuant to 35 U.S.C. § 134(a), Appellant<sup>2</sup> appeals from the Examiner's decision to reject claims 1–4, 6, 12, 13, 17–29, 31, 32, and 34 of Application 13/147,724. We have jurisdiction under 35 U.S.C. § 6(b).

For the reasons set forth below, we REVERSE.

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<sup>1</sup> In our Decision, we refer to the Specification (“Spec.”) of Application 13/147,724 (“the ’724 Application”) filed Aug. 3, 2011; the Non-Final Office Action dated June 4, 2018 (“Non-Final Act.”); the Appeal Brief filed Nov. 5, 2018 (“Appeal Br.”); the Examiner’s Answer dated Feb. 19, 2019 (“Ans.”); and the Reply Brief filed Apr. 19, 2019 (“Reply Br.”).

<sup>2</sup> We use the word “Appellant” to refer to “Applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Oerlikon Metco AG, Wohlen as the real party in interest. Appeal Br. 3.

STATEMENT OF THE CASE

The '724 Application describes a plasma coating plant for coating or treating a substrate's surface. Spec 1:4–8. During plasma coating, a process gas is heated to generate a plasma jet and a pre-coating material required for coating the substrate is introduced. *Id.* at 1:18–20. Depending on the process, thermal spraying by plasma coating may take place in an evacuated work chamber. *Id.* at 1:11–15. The Specification indicates, however, that a plasma jet moving toward the substrate through an evacuated work chamber causes a suction effect in the region of the plasma jet's nozzle. *Id.* at 2:2–4. According to the '724 Application, this suction effect undesirably directs pre-coating particles at the plasma jet's boundary back towards the plasma jet's nozzle. *Id.* at 2:5–9. The Specification describes that these redirected particles are thereby prevented from becoming sufficiently molten or plastified for coating. *Id.* at 2:9–10. The '724 Application describes a mechanical limiting apparatus, which is said to reduce the undesired intrusion of particles into the plasma jet and concomitant faults in the generated coating. *Id.* at 2:19–22; 3:7–10.

Claim 1, representative of the '724 Application's claims, is reproduced below from the Claims Appendix of the Appeal Brief.

1. A plasma coating plant for coating or treating the surface of a substrate, said plant comprising:
  - an evacuable work chamber into which the substrate can be placed;
  - a plasma torch for generating a plasma jet by heating a process gas;
  - said plasma jet containing coating material for depositing on a substrate;

the plasma torch having a nozzle exit end and through which the plasma jet can exit the plasma torch and can extend along a longitudinal axis (A) into the work chamber;

a mechanical limiting apparatus is arranged inside the work chamber and directly downstream of the nozzle in the work chamber;

said mechanical limiting apparatus having a diameter of at least 5 cm and extending along the longitudinal axis (A) and protecting the plasma jet against an unwanted lateral intrusion of particles disposed in a space surrounding the mechanical limiting apparatus;

an injection apparatus arranged to inject a reactive fluid into the plasma jet, said injection apparatus being installable inside the limiting apparatus at a location that is spaced from the exit end of the nozzle, and

a substrate holder for holding the substrate,

wherein the limiting apparatus extends over at least 80% of a distance between the nozzle and the substrate holder and is configured to essentially prevent contamination of the plasma jet by the unwanted lateral intrusion of particles.

## REFERENCES

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

Name	Reference	Date
Raney et al. (“Raney”)	US 5,951,771	Sept. 14, 1999
Lynum et al. (“Lynum”)	US 5,989,512	Nov. 23, 1999
Tsuji et al. (“Tsuji”)	US 8,399,794 B2	Mar. 19, 2013
Utsunomiya et al. (“Utsunomiya”)	US 2006/0223328 A1	Oct. 5, 2006
Sakakibara et al. (“Sakakibara”)	JP 10162993	June 19, 1998
Calcote	EP 0394735 A2	Oct. 31, 1990

## REJECTIONS

On appeal, the Examiner maintains the following rejections of the claims under 35 U.S.C. § 103(a):<sup>3</sup>

1. Claims 1–4, 6, 12, 13, 17, 18, 22, 24–27, 31, 32, and 34 are unpatentable over the combination of Raney, Lynum, and Utsunomiya. Non-Final Act. 3–11.
2. Claims 19 and 20 are unpatentable over the combination of Raney, Lynum, Utsunomiya, and Tsuji. Non-Final Act. 11–12.
3. Claims 21 and 23 are unpatentable over the combination of Raney, Lynum, Utsunomiya, and Sakakibara. Non-Final Act. 12–13.
4. Claims 28 and 29 are unpatentable over the combination of Raney, Lynum, Utsunomiya, and Calcote. Non-Final Act. 13–17.

## DISCUSSION

*Rejection 1: Obviousness of claims 1–4, 6, 12, 13, 17, 18, 22, 24–27, 31, 32, and 34 over Raney, Lynum, and Utsunomiya*

Because we consider the evidence insufficient to establish a prima facie case of obviousness with regard to recitations found in each of independent claims 1 and 22, we need only address claim 1. The Examiner finds that Raney’s “mechanical limiting apparatus 128 extend[s] along the longitudinal axis (A) and protect[s] the plasma jet against an unwanted

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<sup>3</sup> Because this application was filed before the March 16, 2013, effective date of the America Invents Act, we refer to the pre-AIA version of the statute.

lateral intrusion of particles,” as required by claim 1. Non-Final Act. 3 (citing Raney Fig. 4).

Raney’s Figure 4 is reproduced below:

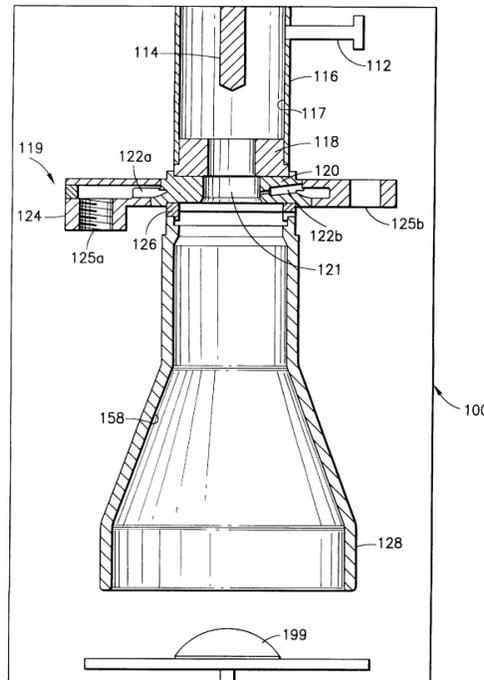


FIG. 4

Raney’s Figure 4 is a broken sectional view showing a plasma jet system. Raney 3:66–67. The elements shown in Figure 4 include plasma jet system 100, anode 118, nozzle 128, and substrate 199. *Id.* 4:23–42.

Appellant argues that Raney “shows a nozzle 128 without any mechanical limiting apparatus disposed or arranged between the nozzle 128 and the substrate 199.” Appeal Br. 9 (citing Raney Fig. 9).

In response, the Examiner argues “that even though Raney uses a different terminology for the structural components, the functions are the same.” Ans. 4. The Examiner finds that Raney’s “component 128 is a structure located downstream of the nozzle 118 (i.e. plasma jet exit) and . . . has the function of protecting and surrounding the plasma jet as it flows through the extended component 128.” *Id.*

Appellant argues that Raney's component 128 has a different function than protecting and surrounding a plasma jet. Reply Br. 2. As explained by Appellant, in Raney, component 128 creates a low pressure region therein to "draw cooler gas upwards from a bottom region to create a shear region around the hot jet." *Id.* at 2–3 (citing Raney 6:28–38). Raney explicitly discloses that

[t]he hot gas leaving the throat 121 of the gas injection disc 120 and entering into the larger volume of the nozzle 128 creates a low pressure region at the top of the nozzle (the Venturi effect). The low pressure region normally draws cooler gas in from the bottom of the nozzle.

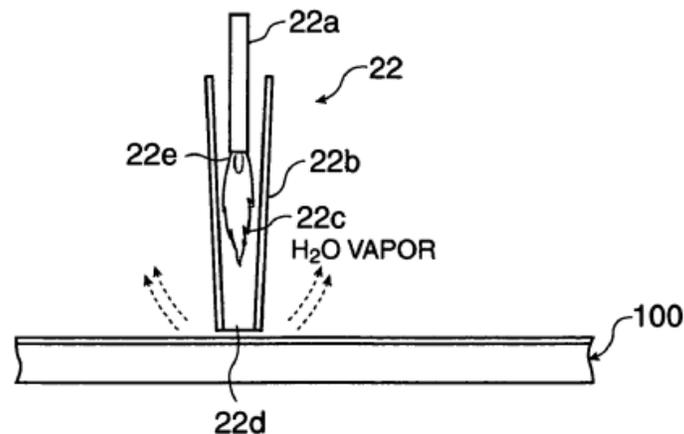
Raney 6:29–34.

Appellant persuasively points out that if Raney's "element 128 functions as described . . . , particles would potentially be sucked into the bottom region of element 128 when cooler gas is drawn upwards from the bottom region to the upper low pressure region." Reply Br. 3. As Appellant argues, this would have defeated the purpose of the mechanical limiting apparatus to prevent contamination of the plasma jet by unwanted lateral intrusion of particles. *Id.* The "articulated reasoning with some rational underpinning" required to support the legal conclusion of obviousness is lacking here. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

The Examiner finds, *inter alia*, that Raney does not explicitly teach that the limiting apparatus, i.e., nozzle 128, extends over at least 80 % of the distance between the nozzle and the substrate holder. Non-Final Act. 5.

The Examiner finds that Utsunomiya teaches "a limiting apparatus that extends over at least 80 % of the distance between the nozzle and the substrate holder in order to achieve the desired pressure condition to facilitate substrate processing." *Id.* (citing Utsunomiya ¶ 58; Fig. 3).

Utsunomiya's Figure 3 is reproduced below:



**FIG. 3**

Utsunomiya's Figure 3 illustrates a gas burner. *See* Utsunomiya ¶ 58. The elements shown in Figure 3 include gas burner 22, air duct 22a, shield 22b, combustion chamber 22c, nozzle 22d, mixed gas outlet 22e, and substrate 100. *Id.*

According to the Examiner, it would have been obvious to one of ordinary skill in the art at the time of the invention to extend Raney's mechanical limiting apparatus 128 at least 80 % of the distance between the nozzle and the substrate holder, as taught by Utsunomiya, in order to achieve the desired pressure condition to facilitate substrate processing. Non-Final Act. 5.

The Examiner's findings concerning Utsunomiya's varying pressure conditions do not take into account Raney's concerns for pressure enabled drawing of cooler gas upwards from the bottom nozzle. *See also* Reply Br. 8. Without an adequate explanation that accounts for each cited reference's pressure use, the Examiner reversibly erred in determining that the

combination of Raney and Utsunomiya would have rendered obvious the claimed distance of the mechanical limiting apparatus.

Moreover, we find that the Examiner's reliance on Utsunomiya's illustration is misplaced as there is no indication that Figure 3 is drawn to scale. *See Krippelz v. Ford Motor Co.*, 667 F.3d 1261, 1268 (Fed. Cir. 2012) ("Th[e] [Federal Circuit] has repeatedly cautioned against overreliance on drawings that are neither expressly to scale nor linked to quantitative values in the specification.").

One of ordinary skill in the art at the time of the invention would not have been motivated to combine the teachings of Raney and Utsunomiya because: (i) Raney's component 128 would not have prevented plasma jet contamination by unwanted lateral intrusion of particles, and (ii) Utsunomiya's Figure 3, depicting a gas burner's shield for achieving a desired pressure condition, is not expressly drawn to scale. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) ("[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does."). In the absence of such an explanation, the rejection must be reversed. *Kahn*, 441 F.3d at 988; *In re Rouffet*, 149 F.3d 1350, 1358 (Fed. Cir. 1998) ("hindsight" is inferred when the specific understanding or principal within the knowledge of one of ordinary skill in the art leading to the modification of the prior art in order to arrive at appellant's claimed invention has not been explained).

The additional Lynum reference relied on by the Examiner in rejecting claim 1 does not cure the deficiencies in the combination of Raney and Utsunomiya discussed above. We are persuaded that the Examiner's cited references fail to establish a prima facie case of obviousness of claim

1. We do not sustain the Examiner's rejection of claim 1. For the same reasons, we do not sustain the Examiner's rejection of obviousness of claims 2-4, 6, 12, 13, 17, 18, 22, 24-27, 31, 32, and 34.

*Rejection 2: Obviousness of claims 19 and 20 over Raney, Lynum, Utsunomiya, and Tsuji*

The additional Tsuji reference relied on by the Examiner in rejecting claims 19 and 20, dependent on claim 1, does not cure the deficiencies in the combination of Raney, Lynum, and Utsunomiya discussed above.

Therefore, we do not sustain the rejection of claims 19 and 20 under 35 U.S.C. § 103(a) over the cited references.

*Rejection 3: Obviousness of claims 21 and 23 over Raney, Lynum, Utsunomiya, and Sakakibara*

The additional Sakakibara reference relied on by the Examiner in rejecting claims 21 and 23, dependent on claims 1 and 22, respectively, does not cure the deficiencies in the combination of Raney, Lynum, and Utsunomiya discussed above. Therefore, we do not sustain the rejection of claims 21 and 23 under 35 U.S.C. § 103(a) over the cited references.

*Rejection 4: Obviousness of claims 28 and 29 over Raney, Lynum, Utsunomiya, and Calcote*

Appellant contends that independent claim 28, and claim 29 (depending from claim 1), are patentable for the same reasons as claim 1. Appeal Br. 28.

The additional Calcote reference relied on by the Examiner in rejecting claims 28 and 29 does not cure the deficiencies in the combination of Raney, Lynum, and Utsunomiya discussed above. Therefore, we do not sustain the rejection of claims 28 and 29 under 35 U.S.C. § 103(a) over the cited references.

CONCLUSION

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1–4, 6, 12, 13, 17, 18, 22, 24–27, 31, 32, 34	103(a)	Raney, Lynum, Utsunomiya		1–4, 6, 12, 13, 17, 18, 22, 24–27, 31, 32, 34
19, 20	103(a)	Raney, Lynum, Utsunomiya, Tsuji		19, 20
21, 23	103(a)	Raney, Lynum, Utsunomiya, Sakakibara		21, 23
28, 29	103(a)	Raney, Lynum, Utsunomiya, Calcote		28, 29
<b>Overall Outcome</b>				1–4, 6, 12, 13, 17–29, 31, 32, 34

REVERSED