

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GERHARD KARL STRAUCH,
JOHANNES LINDNER
and MARCUS SCHUMACHER

Appeal 2007-2670
Application 10/442,215
Technology Center 1700

Decided: November 29, 2007

Before EDWARD C. KIMLIN, CHUNG K. PAK, and
LINDA M. GAUDETTE, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-10, 12, and 14-22. Claims 1 and 5 are illustrative:

1. A method for feeding a liquid starting material, which has been brought into the gaseous state, into a CVD reactor, having a nozzle, which has an annular gas flow passage for communicating a gas flow to the reactor, an annular liquid passage for communicating a liquid to the gas flow, the gas

flow passage surrounding the liquid passage and the liquid passage having an annular diameter that increases in the direction of fluid flow such that the liquid passage opens out transversely into the gas flow passage, in order to form an aerosol which is vaporized by the supply of heat, characterized in that the heat of vaporization is extracted exclusively from the gas.

5. A method for feeding a liquid starting material, which has been brought into the gaseous state, into a CVD reactor, having a nozzle, which has an annular gas flow passage for communicating a gas flow to the reactor, an annular liquid passage for communicating a liquid to the gas flow, the gas flow passage surrounding the liquid passage and the liquid passage having an annular diameter that increases in the direction of fluid flow such that the liquid passage opens out transversely into the gas flow passage, in order to form an aerosol which is vaporized by the supply of heat, characterized in that the opening of the liquid passage is opened and closed in pulsed fashion.

The Examiner relies upon the following references in the rejection of the appealed claims:

Poehlman	4,836,453	Jun. 6, 1989
Linder	5,046,472	Sep. 10, 1991
Ono	5,372,754	Dec. 13, 1994
Tsutsumi	JP 09-36108	Feb. 7, 1997
Li	5,835,677	Nov. 10, 1998
Senateur	5,945,162	Aug. 31, 1999
Lyons	6,245,150 B1	Jun. 12, 2001
Vaartstra	6,244,575 B1	Jun. 12, 2001
Bang	6,261,374 B1	Jul. 17, 2001
Tarutani	6,470,144 B1	Oct. 22, 2002

Appellants' claimed invention is directed to a method and device for feeding a liquid starting material into a CVD reactor through a nozzle having an annular gas flow passage which surrounds an annular liquid passage. The liquid passage has an annular diameter that increases in the direction of the flow of the liquid. Also, the liquid passage opens out transversely into the

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gas flow passage to form an aerosol that is vaporized by heat extracted from the gas material.

Appealed claims 5, 6, 10, 14, 15, 16, 18, and 21 stand rejected under 35 U.S.C. § 102(b) or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Tsutsumi. Claims 10, 12, 14, 21, and 22 stand rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Poehlman or Linder. In addition, the appealed claims stand rejected under 35 U.S.C. § 103(a) as follows:

- (a) claim 17 over Tsutsumi in view of Li or Tarutani,
- (b) claim 19 over Tsutsumi in view of Bang,
- (c) claim 20 over Tsutsumi in view of Ono,
- (d) claims 1-10, 14, 15, 16, 18, and 21 over Vaartstra or Lyons in view of Tsutsumi,
- (e) claim 17 over Vaartstra or Lyons in view of Tsutsumi and Li or Tarutani,
- (f) claim 19 over Vaarstra or Lyons in view of Tsutsumi and Bang,
- (g) claim 20 over Vaarstra or Lyons in view of Tsutsumi and Ono,
- (h) claims 5-8, 10, 12, 14-18, 21 and 22 over Senateur in view of Poehlman and/or Linder,
- (i) claim 17 over Senateur in view of Poehlman and/or Linder further in view of Li or Tarutani,
- (j) claim 19 over Senateur taken in view of Poehlman and/or Linder and Bang, and
- (k) claim 20 over Senateur in view of Poehlman and/or Linder and Ono.

We have thoroughly reviewed Appellants' Principal and Reply Briefs and the Examiner's Answer in reaching our decision.

We consider first the Examiner's § 102/§103 rejection of claims 5, 6, 10, 14-16, 18, and 21 over Tsutsumi. Independent claims 1, 5, and 10 recite a nozzle for feeding a liquid material comprising an annular passage having an annular diameter that increases in the direction of the fluid flow. The Examiner's § 102 and § 103 rejections over Tsutsumi are based on the embodiment depicted in Tsutsumi's Figure 11, which shows a control plug 213 extending into an inner pipe 212d which forms an annual passage between the plug stem and the inner wall of pipe 212d. It is not the Examiner's position that the area between the plug stem and the inner wall of pipe 212d is an annular area whose diameter increases in the direction of the liquid flow. Rather, the Examiner offers the following rationale:

An annular passage exists between the plug stem and the inner pipe 212d. The liquid stream A passes through this annular passage just prior to exiting the inner pipe, and the liquid exits the inner pipe in an annular flow pattern. The annular flow of liquid that exits the inner pipe then strikes the angled contact surface of the control plug 213, and is directed radially outwardly in an annular pattern whose annular diameter increases in the direction of fluid flow. ... From this, it is clear that the liquid flow A is still in the liquid state after it leaves the angled contact surface of the control plug. Therefore, it can be seen that the passage of the liquid past the control plug 213 meets all the requirements of applicants' claim limitation of a 'liquid passage having an annular diameter that increases in the direction of fluid flow'" (Ans. para. bridging pages 13-14).

The Examiner goes on to explain that "it is clear that a 'passage' is not limited to the inside of an enclosed pipe or conduit such as gap 2 of applicants' Fig. 3 [and that] [t]he annular liquid flow around the control plug

213 is an 'annular liquid passage' according to the dictionary definition of 'passage'" (Ans. 14, second para.).

Hence, according to the Examiner, the pertinent claim limitation is met when the liquid flow of Tsutsumi deflects off the angled surface of control plug 213 into the gaseous stream. However, we do not subscribe to this line of reasoning. The appealed claims require that the nozzle has an annular liquid passage with a diameter that increases in the direction of the liquid flow. Once the liquid exits inner pipe 212d of Tsutsumi it no longer is in a passage of the nozzle but, rather, it is now outside the nozzle. Also, we agree with Appellants that once the liquid exits the inner pipe of Tsutsumi it is not confined by an annular passageway that allows for a meaningful measurement of an annular diameter. Accordingly, we cannot agree with the Examiner that any spray profile or plume of liquid deflected from the plug of Tsutsumi fairly qualifies as an annular liquid passage of a nozzle, as presently claimed. Furthermore, we note that the Examiner has not presented any rationale why it would have been obvious for one of ordinary skill in the art to modify the nozzle of Tsutsumi that would have made the claimed nozzle obvious to one of ordinary skill in the art.

The § 103 rejections of claims 17, 19, and 20 over the additional teachings of Li, Bang, and Ono, respectively, must also fall because the secondary references do not alleviate the deficiency of Tsutsumi discussed above. Likewise, the § 103 rejections based on the combinations of Vaartstra and Lyons in view of Tsutsumi cannot be sustained because they are based upon the same erroneous interpretation of Tsutsumi noted above.

We will sustain the Examiner's § 102/§ 103 rejection of claims 10, 12, 14, 21, and 22 over either Poehlman or Linder. Appellants have not

disputed the Examiner's factual determination that both references disclose a device comprising a nozzle having an annular gas flow passage and an annular liquid passage which communicates liquid to the gas flow that surrounds the liquid passage, wherein the liquid passage has an annular diameter that increases in the direction of fluid flow and which opens out transversely into the gas flow passage. The only argument advanced by Appellants against this rejection is that "claim 10 requires a nozzle where the liquid passage is 'open and closed in pulsed fashion'" (Principal Br. 18). However, the Examiner makes the factual finding that "[t]he fuel injectors of Poehlman and Linder are specifically designed as valves to be operated such that they are 'opened and closed in pulse fashion'" (Ans. 21). Also, the Examiner finds that Poehlman teaches that his fuel injector can operate at "fuel injection durations of less than about four milliseconds (*see col. 6, ll. 38-43*)."*(id.)* Since the Examiner's position is reasonable on its face, and has not been refuted or even addressed in Appellants' Reply Brief, we will sustain the rejection.

We will also sustain the Examiner's § 103 rejection of claims 5-8, 10, 12, 14-18, 21, and 22 over Senateur in view of Poehlman and/or Linder. Senateur discloses an atomizing vaporizer for a CVD reactor and, although the Examiner acknowledges that Senateur does not disclose details of the atomizer, the Examiner points out that the reference teaches that a conventional fuel injector of the type used in the automobile industry can be used as the atomizer, citing column 4, lines 34-36. Accordingly, we find no error in the Examiner's legal conclusion that it would have been *prima facie* obvious for one of ordinary skill in the art to employ the fuel injector atomizers of Poehlman and Linder in the system of Senateur for the purpose

of attaining the benefits of such atomizers taught by Poehlman and Linder. Appellants fail to present a substantive argument why such a combination would not have been *prima facie* obvious to one of ordinary skill in the art. Rather, Appellants make the argument that neither Poehlman nor Linder disclose the claim 7 recitation that the "gas stream flowing through the flow passage which produces and transports the aerosol is temperature-controlled" (Principal Br. 16, first para.). In response, the Examiner notes that "Senateur teaches at col. 6, lines 55-59, that "the area adjacent to the injector is cooled or rather maintained at the same temperature as the temperature of the tank 10 to prevent the injector and the liquid volume 11, contained in the emission chamber of the injector and waiting to be injected, from being heated" thereby teaching temperature control of the nozzle (*see* Ans. 19, first para.) The Examiner further explains that "since 'the given stream flowing through the flow passage which produces and transports the aerosol' is within the atomizing nozzle design of Poehlman and Linder, this flow passage and this gas stream would also inherently be 'temperature-controlled' by virtue of its passing through the temperature-controlled nozzle" (id.). We observe, once again, that Appellants' Reply Brief fails to set forth any argument that refutes the Examiner's reasoning. The Reply Brief focuses upon the rejections over Tsutsumi.

We also note that Appellants have not rebutted the separate rejections of claims 17, 19, and 20 over the combination of Senateur, Poehlman and/or Linder further in view of Li, Bang, and Ono, respectively.

In addition, with respect to the § 103 rejections, Appellants base no argument upon objective evidence of nonobviousness, such as unexpected results.

One final point remains. Upon return of this application to the Examiner, the Examiner should consider a prior art rejection of claims 1-4, and 9 over the combination of Poehlman, Linder, Senateur and any other prior art of record, or not of record, under the rationale provided in the Answer underlying the rejections of Poehlman, Linder, and Senateur. In addition, we note that the original Specification does not provide literal, descriptive support for the claim recitation “annual diameter that increases in the direction of fluid flow”. Appellants' counsel at oral hearing could not point to literal support in the Specification for the claim recitation. Accordingly, the Examiner should consider a rejection under 35 U.S.C. § 112, first paragraph, description requirement, for the claim language that is the basis for Appellants' asserted distinction over Tsutsumi. If such a § 112, first paragraph rejection is not entered by the Examiner, the Examiner and Appellants should make of record how the claim recitation has original descriptive support in the Specification within the meaning of § 112, first paragraph.

In conclusion, based on the foregoing, the Examiner's decision rejecting claims 1-4, and 9 is reversed, whereas the Examiner's decision rejecting claims 5-8, 10, 12, and 14-22 is sustained.

Accordingly, the Examiner's decision rejecting the appealed claims is affirmed-in-part. Also, the application is Remanded to the Examiner for consideration of a prior art rejection of claims 1-4, and 9, as well as for consideration of a rejection of all the appealed claims under 35 U.S.C. § 112, first paragraph, description requirement.

In addition to affirming the Examiner's rejection of one or more claims, this decision contains a remand. 37 C.F.R. § 41.50(e) (effective September

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13, 2004, 69 Fed. Reg. 49960 (August 12, 2004), 1286 Off. Gaz. Pat. Office 21 (September 7, 2004)) provides that

[w]henever a decision of the Board includes a remand, that decision shall not be considered final for judicial review. When appropriate, upon conclusion of proceedings on remand before the examiner, the Board may enter an order otherwise making its decision final for judicial review.

Regarding any affirmed rejection, 37 C.F.R. § 41.52(a)(1) provides "[a]ppellant may file a single request for rehearing within two months from the date of the original decision of the Board."

The effective date of the affirmance is deferred until conclusion of the proceedings before the Examiner unless, as a mere incident to the limited proceedings, the affirmed rejection is overcome. If the proceedings before the Examiner do not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejections, including any timely request for rehearing thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(vi)(effective Sept. 13, 2004).

AFFIRMED-IN-PART/REMANDED

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