

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today
(1) was not written for publication in a law journal and
(2) is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte VOLKER DIEHL,
KLAUS JOACHIM MULLER-ENGEL AND
GERHARD NESTLER

Appeal No. 2006-1116
Application No. 10/450,439¹

HEARD: May 11, 2006

Before CAROFF, PAK, and WALTZ, Administrative Patent Judges.

PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal from the examiner's refusal to allow claims 1 through 10, which are all of the claims pending in the present application. We have jurisdiction pursuant to 35 U.S.C. § 134.

¹ Application for patent filed June 18, 2003.

APPEALED SUBJECT MATTER

The subject matter on appeal is directed to cooling a hot gas mixture containing (meth)acrylic acid. See the Specification, page 1. Further details of the appealed subject matter are recited in representative claim 1 which is reproduced below:

1. A process for cooling a hot gas mixture which comprises (meth) acrylic acid comprising:
cooling by means of a cooling liquid in a spray cooler,
wherein at least one impingement atomizer is used for atomizing the cooling liquid in the spray cooler.

The term "impingement atomizer" recited in claim 1 is used to define atomization that "is effected by at least one stream of the cooling liquid (quenching liquid) impinging either on at least a second stream of the cooling liquid and/or on an impingement plate." See the Specification, page 4. This impingement atomizer is said to overcome the clogging problem associated with "the atomizer nozzles [such as single-fluid nozzles] used in the prior art for atomization..." See the Specification, page 3. The clogging problem of the single-fluid nozzles is attributed **in part** to the formation of polymers (via free radical polymerization) which "are generally sticky and easily lead to blockage of the spray nozzles." Id.

Appeal No. 20006-1116
Application No. 10/450,439

EVIDENCE

As evidence of obviousness of the claimed subject matter,
the examiner relies upon the following prior art:

Suzuki et al. (Suzuki)	4,531,677	Jul. 30, 1985
Wu et al. (Wu)	6,322,054 B1	Nov. 27, 2001

The appellants' admission at pages 2-5 and 7 of the specification (hereinafter referred to as "the admitted prior art").

As evidence of nonobviousness of the claimed subject matter,
the appellants rely upon the following reference:

Schroder et al. (Schroder)	6,498,272 B1	Dec. 24, 2002
----------------------------	--------------	---------------

REJECTIONS

Claims 1 through 10 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of the admitted prior art and either Suzuki or Wu.

OPINION

We have carefully reviewed the claims, specification and applied prior art, including all of the arguments advanced by the examiner and the appellants in support of their respective positions. This review has led us to conclude the examiner's Section 103(a) rejection is well founded. Accordingly, we affirm

Appeal No. 20006-1116
Application No. 10/450,439

the examiner's rejections for reasons essentially based upon the findings of fact set forth in the Answer. We add the following primarily for emphasis and completeness.

Under Section 103, the obviousness of an invention cannot be established by combining the teachings of the prior art references absent some teaching, suggestion or incentive supporting the combination. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). This does not mean that the prior art references must specifically suggest making the combination. B.F. Goodrich Co. v. Aircraft Braking Systems Corp., 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996); In re Nilssen, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988). Rather, the test for obviousness is what the combined teachings of the prior art references would have suggested to those of ordinary skill in the art. In re Young, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991); In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). This test requires us to take into account not only the specific teachings of the prior art references, but also any inferences which one skilled in the art would reasonably be expected to draw therefrom. In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968).

With the above precedents in mind, we turn to the examiner's Section 103(a) rejection. As indicated by the examiner at page 3 of the Answer, the appellants acknowledge (the Specification, page 2, lines 23-35 and page 3, lines 4-18) that:

It is known from DE-A 19 740 252, DE-A 19 740 253, DE-A 19 833 049, DE-A 19 814 375, DE-A 19 814 421, DE-A 19 814 449, DE-A 10 053 086, DE-A 10 039 025, DE-A 19 924 533 and DE-A 19 924 532 that a basic separation of the (meth)acrylic acid present in the hot product gas mixture from heterogeneously catalyzed gas-phase partial oxidations of C₃/C₄ precursors of (meth)acrylic acid can be carried out by subjecting the hot product gas mixture to direct precooling (quenching) by means of a cooling liquid and then partially or fully condensing it or absorbing it in a suitable absorption medium (e.g. [,] water, (meth)acrylic acid, oligomeric (meth)acrylic acid....).

...
To carry out the direct cooling of the hot product gas mixture from the heterogeneously catalyzed gas-phase partial oxidation of C₃/C₄ precursors of (meth) acrylic acid by means of a cooling liquid, DE-A 19 924 533 recommends the use of spray coolers which are free of internals.

To atomize the cooling liquid, DE-A 19 924 533 provides for the use of atomizer nozzles. The cooling liquid can, for example, be introduced under pressure into such nozzles. The cooling liquid is atomized by being pressurized in the orifice of the nozzle after reaching a certain minimum velocity. Furthermore, **single-fluid nozzles** such as swirl chamber nozzles (hollow cone or solid cone nozzles) are available for the abovementioned purpose... (Emphasis added.)

The examiner recognizes that the appellants do not acknowledge that the use of the claimed impingement atomizer is known in the art. See the Answer, page 3.

Appeal No. 20006-1116
Application No. 10/450,439

To account for this deficiency, the examiner relies on the teachings of either Suzuki or Wu. See the Answer, pages 3-4. We find that Suzuki teaches an impingement atomizer "for various uses in which atomization of a liquid is required," including a cooling system. See column 1, lines 5-12 and 53-55, column 2, lines 55-58 and column 4, lines 23-46. This impingement atomizer, according to column 1, lines 11-17 and 27-39, of Suzuki, obviates various problems associated with the single-fluid nozzles. We find that Suzuki specifically teaches (column 1, lines 27-39) that:

The single hole injector is formed by drilling, electric discharging or other known techniques. With these known techniques, however, it has been difficult to form a nozzle port having a diameter of less than 0.1 to 0.05 mm. In addition, it has been quite difficult to maintain the required precision in this size of nozzle port when the atomizer is mass-produced. Furthermore, an atomizer having an injector with a single nozzle port tends to become clogged with foreign matter and, hence, it is necessary to filtrate the liquid by a filter or strainer of fine mesh in order to trap the foreign matter. Besides, the single hole injector is not suitable for obtaining a high rate of atomization.

We find that Suzuki teaches that its impingement atomizer avoids "clogging of the atomizing injector while attaining high precision of atomization..." See column 1, lines 11-17. We find that Suzuki teaches that its impingement atomizer has "an injector with fine nozzle ports finished with high precision...to

Appeal No. 20006-1116
Application No. 10/450,439

permit easy fabrication" and provides finer droplets. See column 1, lines 45-52 and column 4, lines 43-46. We find that Suzuki teaches additional advantages of using its atomizer over a conventional atomizer at column 2, line 63 to column 3, lines 43.

Given the above teachings, we concur with the examiner that one of ordinary skill in the art would have been led to employ the impingement atomizer of the type discussed in Suzuki, in lieu of the conventional single-fluid nozzles, in the admittedly known process for cooling a hot gas mixture containing (meth)acrylic acid, motivated by a reasonable expectation of successfully obtaining the advantages enumerated in Suzuki².

The appellants argue that Suzuki is directed to using its impingement atomizer to minimize an internal clogging problem associated with a single hole atomizer, rather than to prevent the external clogging problem caused by the formation of polymer discussed in the appellants' specification. See the Brief, pages 5-8 and the Reply Brief, pages 1-3. As such, "[t]here is no

² At best, Wu is cumulative to Suzuki and thus, it need not be discussed in this decision.

Appeal No. 20006-1116
Application No. 10/450,439

motivation to use the atomizer of Suzuki" in the admittedly known cooling process especially since there is no recognition of the internal clogging problem existed in the atomizer used in the admittedly known cooling process as is apparent from the disclosure of Schroder. See, e.g., the Reply Brief, pages 1-3. We are not persuaded by the appellants' argument.

As indicated supra, Suzuki provides various incentives for employing its impingement atomizer in the admittedly known cooling process. More importantly, Suzuki teaches that its impingement atomizer solves the internal clogging problem and other problems associated with use of conventional single hole atomizers, such as those conventionally used in the admittedly known cooling process. Thus, we concur with the examiner that the prior art references as a whole would have motivated one of ordinary skill in the art to employ the impingement atomizer of the type discussed in Suzuki in the admittedly known cooling process.

In reaching this determination, we note the appellants' implication that the reason for using an impingement atomizer contemplated by the appellants is not mentioned in Suzuki or the admitted prior art³. However, the motivation to modify the

³ During the hearing, the appellants argued that the

Appeal No. 20006-1116
Application No. 10/450,439

admittedly known cooling process taught in Suzuki need not be the same as the one contemplated by the appellants so long as it is sufficient to motivate one of ordinary skill in the art, as here, to modify the admittedly known cooling process in the claimed manner. In re Beattie, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992) ("As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor."); In re Gershon, 372 F.2d 535, 539, 152 USPQ 602, 604-05 (CCPA 1967) ("We think it is sufficient that the prior art clearly suggests doing what appellants have done, although an underlying explanation of exactly why this should be done, other than to obtain the expected superior beneficial results, is not taught or suggested in the cited references.").

In any event, we determine that only simple observation is required to determine the external clogging problem of the

external clogging of the atomizer port caused by polymerization in the admittedly known cooling process is not known in the art.

Appeal No. 20006-1116
Application No. 10/450,439

atomizer caused by free radical polymerization. See In re Ludwig, 353 F.2d 241, 147 USPQ 420 (CCPA 1965). When the atomizer can no longer function as the atomizer due to the external clogging caused by sticky polymer, one of ordinary skill in the art will readily observe such problem after the atomizer is removed from a cooling chamber. This is especially true in this case since Schroder, relied upon by the appellants, teaches that one of ordinary skill in the art knows that in the admittedly known cooling process, acrylic acid undergoes free radical polymerization. See column 1, lines 59-65. Thus, from our perspective, one of ordinary skill in the art recognizing the advantage of the impingement atomizer of the type discussed in Suzuki, i.e., a fluid stream being sufficiently pressurized to wash away foreign matter clogging the nozzle port, would have been led to use such atomizer to reduce the observed clogging problem of the nozzle port associated with the admittedly known cooling process.

Thus, for the reasons set forth above and in the Answer, we concur with the examiner that the prior art references would have rendered the subject matter defined by all the claims on appeal obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103.

Appeal No. 20006-1116
Application No. 10/450,439

CONCLUSION

For the reasons set forth in the Answer and above, we affirm the examiner's decision rejecting the claims on appeal under Section 103(a).

Appeal No. 20006-1116
Application No. 10/450,439

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (2004).

AFFIRMED

MARC L. CAROFF)	
Administrative Patent Judge)	
)	
)	
)	BOARD OF PATENT
CHUNG K. PAK)	APPEALS AND
Administrative Patent Judge)	INTERFERENCES
)	
)	
)	
THOMAS A. WALTZ)	
Administrative Patent Judge)	

CKP:TF

Appeal No. 20006-1116
Application No. 10/450,439

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