

The opinion in support of the decision being entered today was **not** written for publication and is **not** precedent of the Board.

Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TUE NGUYEN

Appeal No. 2002-0177
Application No. 09/325,835

ON BRIEF

Before GARRIS, OWENS, and PAWLIKOWSKI, **Administrative Patent Judges**.

PAWLIKOWSKI, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on an appeal from the final rejection of claims 1-14 and 17. Claims 15, 16 have been cancelled. Claims 18-20 have been with drawn from consideration.

The subject matter on appeal is represented by claims 1, 11, 12, 14 and 17, each of which are set forth below:

1. A showerhead plate of a showerhead like precursor delivery apparatus, comprising:

a plurality of delivery apertures placed in specified geometric pattern about the showerhead plate, where each delivery aperture is comprised of a large diameter bore to provide improved flow conduction across the showerhead plate and a smaller diameter bore that communicates with the large diameter bore to provide proper mixing of the precursor and a consistent pressure level across the entire showerhead plate to provide a uniform delivery of precursor to each delivery aperture; and

a heater means that maintains the showerhead plate at a specified constant temperature, where the heater means supply sufficient thermal energy to the showerhead plate to maintain the specified temperature and compensate for the dissipation of heat caused by the precursor as it moves through the plate.

11. The precursor delivery system in accordance with claim 1, wherein heating means is embedded in the showerhead plate.

12. The precursor delivery system in accordance with claim 1, wherein the delivery plurality of aperture of the showerhead plate form a [sic] array of concentric circles.

14. A showerhead system with improved flow conduction and thermal conductance for a precursor delivery apparatus comprising:

- a plurality of precursor inlet ports;
- a first showerhead plate having improved flow conduction and thermal conductance;
- a baffle plate below the precursor inlet ports to diffuse the precursor dispensed from the inlet and
- a second showerhead plate with improved flow conduction and thermal conductance at the precursor inlet ports to diffuse the precursor dispensed from the inlet.

17. The showerhead system in accordance with claim 14, wherein an area containing the delivery apertures of the second showerhead plate is smaller than the area containing the delivery aperture of the first showerhead plate;

the delivery holes of the second high flow conductance and high thermal conductance showerhead plate are tilted outward for delivering the precursor uniformly at a greater area.

The references relied upon by the examiner as evidence of unpatentability are:

Rose et al. (Rose)	4,792,378	Dec. 20, 1988
Vukelic	5,268,034	Dec. 07, 1993
Murakami et al. (Murakami)	5,728,223	Mar. 17, 1998
Japanese Publication (Ogi)	JP57-38721	Mar. 02, 1982

Claims 1-10 and 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over appellant's admitted prior art in view of Vukelic.

Claim 11 stands rejected under 35 U.S.C. § 103 as being unpatentable over appellant's admitted prior art in view of Vukelic and further in view of Murakami.

Claims 12 and 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over appellant's admitted prior art in view of Vukelic and further in view of Ogi.

Claim 17 stands rejected under 35 U.S.C. § 103 as being unpatentable over appellant's admitted prior art in view of Vukelic and Ogi, and further view of Rose.

As indicated on page 5 of the brief, the claims on appeal will stand or fall with each aforementioned rejection. Therefore, we consider claims 1, 11, 12, 14, and 17. 37 CFR § 1.192 (c) (7) (8) (2000).

OPINION

For the reasons set forth below, we will sustain some of the afore-noted rejections, but we will also reverse some of the above-noted rejections.

I. 35 U.S.C. § 103 rejection of claims 1-10 and 13

As pointed out by the examiner on pages 4-5 of the answer, Figure 2 of appellants' specification (admitted prior art) shows a showerhead comprising a delivery hole 6, a showerhead heater 3, and a baffle 8.

We further note that Figure 2 (admitted prior art) indicates that the delivery hole 6 has, on one side, a large diameter bore, and, on the other side, a smaller diameter bore. Hence, contrary to appellant's assertions made throughout the brief, the admitted prior art teaches a plurality of delivery apertures placed in specified geometric pattern about the showerhead plate, where each delivery aperture is comprised of a large diameter bore and a smaller diameter bore.

We note that the examiner relies on Vukelic regarding the thickness of the showerhead plate. However, the thickness is not a requirement of claim 1 and we need only consider claim 1 because, as admitted by appellant, this grouping of claims under this rejection stand or fall together. 37 CFR § 1.192 (c) (7) (8) (2000). Because Vukelic is relied upon for the thickness of the showerhead, we do not discuss this reference in sections II-IV of the decision.

In view of the above, we affirm this rejection.

II. The 35 U.S.C. § 103 rejection of claim 11

On page 9 of the brief, appellant argues that Murakami does not have an embedded heater, but rather, uses an external heater 63 as shown in Figure 9.

Upon our review of Murakami in this regard, we find that, as shown in Figure 9, the heat medium is supplied through heat medium pipe 62. The heat medium pipe is combined with a heater 63 for heating the heat medium. An extractor 64, such as a

pump, is used for extracting the heat medium from the heat medium passages defined in the reactor 1, the support base 2, and sleeve 6. Part of the heat medium supplied through the heat medium pipe 62 is also supplied to the reactant gas ejector head 5. (See column 8, lines 5-15 of Murakami). From this disclosure, we are unable to conclude that a heater is embedded in the reactant gas ejector head 5. Hence, we agree with appellant's interpretation of Murakami and we disagree with the examiner's interpretation of Murakami in this regard.

Therefore, we reverse this rejection.

III. The 35 U.S.C. § 103 rejection of Claims 12 and 14

As a preliminary matter, we note that claim 14 requires a first and second showerhead plate. It appears that the examiner has overlooked this aspect of claim 14 because, as discussed under section IV of this decision, the examiner discusses this particular subject matter in connection with claim 17, which depends on claim 14. The examiner does not discuss this subject matter in this rejection.

Appellant's claim 12 requires that the showerhead plate have apertures in the form of an array plurality of concentric circles.

On page 10 of the brief, appellant argues that Ogi does not show that the delivery aperture is comprised of a large diameter bore and a smaller diameter bore.

Upon our view of Ogi, we find that, as stated by the examiner on page 7 of the answer, Figure 4B of Ogi depicts concentric circles. Hence we are in agreement with the examiner that such a shape is known in the art.

We further note that Vukelic indicates at column 4, beginning at line 35, that a perforated plate can have a

multiplicity of perforations, and the size, spacing and arrangement of the perforations will vary with the specific use of the fluid distribution head. Hence, as stated by the examiner on page 5 of answer, the size and shape of delivery holes are art-recognized variables.

Therefore, we affirm the rejection of claim 12.

However, with respect to the rejection of claim 14, the examiner's rejection does not set forth how the combination of references in this rejection meets the requirement of claim 14 regarding a first and second showerhead plate, as mentioned supra. We refer to our comments set forth below in connection with rejection involving claim 17. In this regard, we reverse the rejection of claim 14.

IV. The 35 U.S.C. § 103 rejection of Claim 17

The examiner relies upon Rose, and states that Rose discloses a gas dispersion disk 20 and showerhead electrode 28. The examiner concludes that based on this disclosure, it would have been obvious to utilize two showerheads. On page 7 of the answer, the examiner also asserts that duplication of parts has been held to be obvious.

Firstly, an apparatus having a first showerhead plate and a second showerhead plate, as for example, depicted in appellant's Figure 14 or Figure 15, is not a duplication of parts as asserted by the examiner.

Secondly, upon our review of Rose, particularly Figure 1, in column 4 at lines 38-43, Rose indicates that the gas dispersion disk 20 functions as a selective barrier and is thus effective to counteract gradient pressures existing above a disk and provides a uniform flow of vapors through the showerhead for distribution of the entire surface of the slice 37. This is not

a teaching of a first showerhead plate and a second showerhead plate as required by claim 14, upon which claim 17 depends. In this context, we note that appellants point out on page 11 of the brief that Rose is directed to a chemical vapor transport reactor gas dispersion disk 20 for counteracting vapor pressure gradients to provide a uniform deposition of material films. Hence appellant also recognizes that element 20 in Figure 1 of Rose is a dispersion disk and not a second showerhead plate.

Furthermore, claim 17 requires that the delivery holes of the second showerhead plate are tilted outward for delivering the precursor uniformly at a greater area. The examiner has not explained how Rose meets this aspect of appellant's claim 17.

Therefore, we reverse this rejection.

V. Conclusion

We affirm the rejection of claims 1-10 and 13 under 35 U.S.C. § 103 over appellant's admitted prior art in view of Vukelic.

We reverse the rejection of claim 11 under 35 U.S.C. § 103 over appellant's admitted prior art in of Vukelic and in further view of Murakami.

We affirm the rejection of claim 12 under 35 U.S.C. § 103 over appellant's admitter prior art in view of Vukelic and further view of Ogi. However, we reverse the rejection of claim 14 in this regard.

We reverse the rejection of claim 17 under 35 U.S.C. § 103 over appellant's admitted prior art in view of Vukelic and Ogi and further view of Rose.

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

AFFIRMED-IN-PART

BRADLEY R. GARRIS)
Administrative Patent Judge)
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