

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KEVIN E. MCCARTY, ROBERT J. KEE,
ANDREW E. LUTZ and ELLEN MEEKS

Appeal No. 1996-3626
Application 08/302,155¹

ON BRIEF

Before METZ, JOHN DOUGLAS SMITH and PAK, **Administrative Patent Judges**.

METZ, **Administrative Patent Judge**.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 1 through 9 and 23. Original claims 10 through 22, which are claims directed to

Application for patent filed September 8, 1994.

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the previously non-elected invention, have been canceled and form no issue in this appeal.

THE INVENTION

The appealed subject matter is directed to a method for improving the efficiency of various processes which introduce and distribute reactant gases. Such processes include cleaning and etching surfaces, materials synthesis, such as chemical vapor deposition (CVD) and flame synthesis of diamond films. The process utilizes constrained stagnation flow geometry, including so-called axisymmetric flow, to achieve an efficient process. According to appellants, they discovered that by surrounding the inner flow of reactant gas with either an outer flow of gas (coflow, see **Fig. 3**) or with a mechanical means (trumpet bell, see **Fig. 4**) ideal stagnation flow properties of the reactant gases are obtained yielding processes highly efficient in the use of reactants.

Claims 1, 2 and 8 are believed to be adequately representative of the appealed subject matter and are reproduced below for a more facile understanding of

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appellants' claimed invention.

Claim 1. A method of improving the efficiency of material processing and combustion systems wherein the use of reactants is minimized and the area of uniform deposition of heat or materials delivered to a substrate surface is maximized, comprising the steps of:

causing an entrant reactant gas to flow in a radially uniform fashion, the flow directed substantially perpendicular to a substrate;

maintaining the entrant reactant gas at a substantially uniform temperature;

constraining the reactant gas flow at a dividing streamline while maintaining stagnation flow wherein heat and mass flux to the surface of a substrate are substantially radially uniform; and

maintaining the substrate at a uniform temperature.

Claim 2. The method of claim 1 wherein the reactant gas flow is constrained at the dividing streamline by means of a coaxial flow of two different gases in which the flow of an inner reactant gas is contained within an outer flow of second gas further constraining the inner gas flow to follow the streamlines of ideal stagnation flow.

Claim 8. The method of claim 1 wherein the dividing streamline is maintained by means of a fixture whose shape conforms to the shape of said dividing streamline.

THE REJECTIONS

Claims 1 through 9 and 23 stand rejected under 35 U.S.C. § 103 as being unpatentable from the combined disclosures of

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Mikoshiha et al., considered with Wu et al.².

OPINION

After a thorough review of the claims before us considered in light of appellants' disclosure, the prior art of record in the prosecution history and the respective positions of both the appellants and the examiner, we conclude that considerable speculation as to the meaning of the claim terminology "maintaining the entrant reactant gas at a substantially uniform temperature" and "constraining the reactant gas flow at a dividing streamline" and the scope of the claims was engaged in by both the appellants and the examiner. Accordingly, we take the unusual step of summarily reversing the examiner's rejection and entering the following new ground of rejection, because the rejection was improperly founded on speculation and assumptions by both the appellants and the examiner. Compare In re Steele, 305 F.2d 859, 134 USPQ 292 (CCPA 1962).

NEW GROUND OF REJECTION

Pursuant to our authority under 37 C.F.R. § 1.196(b), we

² The examiner has stated his rejection as obvious over Mikoshiha et al. in view of Wu et al., "and vice-versa." See page 3 of the Examiner's Answer.

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enter the following new ground of rejection.

Claims 1 through 9 and 23 are rejected under 35 U.S.C. § 112, second paragraph, because it cannot be determined what is meant by the claim language "maintaining the entrant reactant gas at a substantially uniform temperature" and "constraining the reactant gas flow at a dividing streamline".

Appellants' claims are so-called "comprising" claims and are of considerable scope. As we have noted above, appellants' invention includes two embodiments by which the "reactant gas flow" is constrained: (1) by use of an outer flow of a gas which constrains the inner, reactant gas; and (2) by use of a fixture whose shape conforms the shape of the reactant gas to a "dividing streamline". Appellants' method also requires "maintaining the entrant reactant gas at a substantially uniform temperature."

According to appellants' disclosure, when the method utilizes the fixture to conform the shape of the gas to the "dividing streamline", the uniformity of the gas temperature is "achieved by controlling the bell temperature using water cooling 32." However, there is no disclosure in the appellants' specification with respect to the means by which

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the reactant gas temperature is maintained when the reactant gas flow is constrained by means of a coaxial flow of two different gases. Thus, we are left to conjecture on how appellants achieve what they have claimed as their invention.

In the specification, we are directed to U.S. Patent Number 4,798,165, for a teaching of how a gas carrying deposition materials to a substrate is constrained to have an axial symmetry. In said patent at column 3, lines 51 through 55 and column 4, lines 33 through 38, it is disclosed that axially symmetrical gas flow toward a surface is referred to as stagnation point flow. The axially symmetrical gas flow is induced by means of a multiplicity of apertures over the surface of a disk approximately the same size as the substrate and through which the reactant gas flows (column 3, line 56 through column 4, line 9). It is known that the temperature profile of the gas impinging on the substrate, as well as the mole fraction of the gas components at a given distance from the substrate surface, are generally radially uniform (column 4, lines 50 through 58).

Appellants disclose that they obtain their stated goal of

improved efficiency by means of specially designed gas or reactant systems "whose designs are based on calculations of the streamlines of ideal stagnation flow." Page 5, lines 23 through 28 of the specification. At page 8, lines 12 through 14 of the specification, appellants disclose that the "dividing streamline" determines a critical radius at the inlet plane and at lines 19 through 22, appellants acknowledge that it is the recognition that the dividing streamline formed by the flow of gas or mechanical means at the boundary of the above noted critical region that "is crucial to maintaining the desirable property of stagnation flow." Appellants further disclose at pages 10 and 11 of their specification that for their embodiment wherein the reactant gas is constrained by mechanical means (the trumpet bell), the design (shape) of the mechanical means is calculated using a "software package for modeling one dimensional rotating disk stagnation flow chemical vapor deposition reactors."

Appellants' claims, however, are not limited to rotating disk stagnation flow chemical vapor deposition reactors, chemical vapor deposition reactors or chemical vapor deposition reactions. Thus, whether or not the presumptions

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inherent in the program used for manufacturing the critical design of the specific reactor's shape which apply to CVD reactions can be presumed to adhere for the other types of reactions embraced by appellants' claims is unclear. Further, whether or not the program applied by appellants would even be useful in designing and building a system for appellants' method using coaxial flow of gases to constrain the reactant gas is not clear. Still further, because it appears from appellants' disclosure that the "dividing streamline" depends on numerous process variables, it is also unclear what constitutes "a dividing streamline" in the context of a CVD system different from the one described in Example 1 wherein a diamond film is prepared from acetylene, hydrogen and oxygen at atmospheric pressure.

We recognize that appellants have disclosed that they determine the defining streamline by the application of equations (1) through (7) found on page 10 of their specification and that a software program for modeling the reactors for their methods based on equations (1) through (7) has been developed and used to calculate the shape of the trumpet bell (see page 11 of the specification). However, the

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reference to the software package is the only disclosure we find which instructs the hypothetical person of ordinary skill in the art on what the claimed method embraces. We think the disclosure at page 5, lines 23 through 25 of the specification supports a finding that the nature of the program is essential to understanding exactly what appellants are claiming. On the other hand, if appellants are merely optimizing stagnation flow relationships well-known in the art as exemplified by the equations set forth on page 10 of the specification as applied by the program, then, under well-settled case law, neither the specification nor the claims need recite the details of appellants' method to such a degree the specification or claims become a blueprint for performing the claimed invention.

SUMMARY

The rejection of the claims under 35 U.S.C. § 103, is **reversed**. We have made a new ground of rejection under 37 C.F.R. § 1.196(b).

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 1.196(b) (amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10,

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1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 C.F.R. § 1.196(b) provides that, "A new ground of rejection shall not be considered final for purposes of judicial review."

37 C.F.R. § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (§ 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

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

REVERSED
37 C.F.R 1.196(b)

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