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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/013,434	12/17/2004	David Walter Peters	21453	1755
27182	7590	01/29/2013	EXAMINER	
PRAXAIR, INC. LAW DEPARTMENT - M1-04 39 OLD RIDGEBURY ROAD DANBURY, CT 06810-5113			CHANDRA, SATISH	
			ART UNIT	PAPER NUMBER
			1716	
			MAIL DATE	DELIVERY MODE
			01/29/2013	PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT AND TRIAL APPEAL BOARD

Ex parte DAVID WALTER PETERS

Appeal 2011-012537
Application 11/013,434
Technology Center 1700

Before ROMULO H. DELMENDO, JEFFREY T. SMITH, and
GRACE KARAFFA OBERMANN, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134 from a final rejection of claims 1 through 14 and 21 through 23. We have jurisdiction under 35 U.S.C. § 6.

Appellant's invention is directed to a sweep vapor phase reagent dispensing apparatus used to deliver a vapor phase reagent to a deposition chamber. App. Br. 7-9. Claim 1 is illustrative of the subject matter on appeal and is reproduced below:

1. A vapor phase reagent dispensing apparatus consisting essentially of:

a vessel bounded on its upper end by a top wall member and on its lower end by a bottom wall member to define therewithin an interior volume;

the bottom wall member having a main floor surface containing a sump cavity therein extending downwardly from the main floor surface, the sump cavity being bounded at its lower end by a sub-floor surface, with at least a portion of the sump cavity being centrally located on the bottom wall member and at least a portion of the sump cavity being non-centrally located on the bottom wall member;

a temperature sensor extending from an upper end exterior of the vessel through a centrally located portion of the top wall member and generally vertically downwardly into the interior volume of the vessel to a lower end of that portion of the sump cavity centrally located on the bottom wall member, with the lower end of the temperature sensor being located in non-interfering proximity to the sub-floor surface of the sump cavity;

a liquid reagent level sensor extending from an upper end exterior of the vessel through a non-centrally located portion of the top wall member and generally vertically downwardly into the interior volume of the vessel to a lower end of that portion of the sump cavity non-centrally located on the bottom wall member, with the lower end of the liquid reagent level sensor

being located in non-interfering proximity to the sub-floor surface of the sump cavity; and

the temperature sensor being operatively arranged in the sump cavity to determine the temperature of liquid reagent in the vessel, the liquid reagent level sensor being operatively arranged in the sump cavity to determine the level of liquid reagent in the vessel, the temperature sensor and liquid reagent level sensor being located in non-interfering proximity to each other in the sump cavity, with the lower end of the temperature sensor being located at the same or closer proximity to the subfloor surface of the sump cavity in relation to the lower end of the liquid reagent level sensor, and the temperature sensor and liquid reagent level sensor being in liquid reagent flow communication in the sump cavity.

The Examiner relied on the following references in rejecting the appealed subject matter:

McMenamin	US 4,436,674	March 13, 1984
Ban	US 5,336,356	August 9, 1994
Bouchard	US 6,077,356	June 20, 2000
Nguyen	US 2004/0007581 A1	January 15, 2004

Appellant, App. Br. 10, requests review of the following rejections from the Examiner's final office action:

- I. Claims 1, 3-10, 12, 13 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over McMenamin and Bouchard.
- II. Claims 2, 14, 22 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over McMenamin, Bouchard and Ban.
- III. Claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over McMenamin, Bouchard and Nguyen.
- IV. Claims 1-10, 12-14, and 21-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ban, Bouchard and McMenamin.
- V. Claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ban, Bouchard, McMenamin and Nguyen.

OPINION

The dispositive issue for this appeal is: Did the Examiner err in determining that the combination of McMEnamin and Bouchard would have led one skilled in the art to a vapor phase reagent dispensing apparatus as required by the subject matter of independent claims 1 and 22?^{1,2}

After thorough review of the respective positions provided by Appellant and the Examiner, we answer this question in the negative and AFFIRM for the reasons presented by the Examiner.

According to Appellant, modern chemical vapor deposition and atomic layer deposition tools utilize ampoule systems to deliver precursor chemicals to a deposition chamber. Spec. 1; App. Br. 11. The ampoule systems can be categorized as sweep vapor phase reagent dispensing systems, bubbler vapor phase reagent dispensing systems, and dip tube liquid phase reagent dispensing systems. App. Br. 11.

The *sweep* vapor phase reagent dispensing system is described as delivering the precursor reagent as a vapor by heating a liquid precursor reagent source within the ampoule to vaporize at least a portion of the liquid source, feeding a carrier gas into the ampoule through an inlet opening and withdrawing the vapor phase precursor reagent and carrier gas from the ampoule through an outlet opening. *Id.*

A *bubbler* vapor phase reagent dispensing system delivers the precursor reagent as a vapor by heating a liquid precursor reagent source within the ampoule to vaporize at least a portion of the liquid source, feeding

¹ We focus our discussion on independent claim 1.

² A discussion of Ban and Nguyen is unnecessary for disposition of the present appeal. The Examiner relied upon these references for features not related to the dispositive issue.

a carrier gas into the ampoule through a bubbler tube extended into the liquid source to near the bottom of the ampoule so that carrier gas exiting the bubbler tube will bubble upwardly through the liquid source. *Id.* The vapor phase precursor reagent and carrier gas are then withdrawn from the ampoule through an outlet opening. *Id.*

A *dip tube* liquid phase reagent dispensing system differs from the previously discussed systems in that a liquid phase precursor reagent instead of a vapor phase precursor reagent is withdrawn from the ampoule. *Id.* at 12. In the dip tube liquid phase reagent dispensing system, an inert gas is fed into the ampoule through an inlet opening to impose pressure on the volume of liquid phase reagent in the ampoule. *Id.* The liquid phase reagent is then withdrawn from the ampoule through a dip tube that extends from near the bottom of the ampoule upwardly. *Id.* The pressurization of the liquid phase reagent causes the liquid phase reagent to flow upwardly into the dip tube for discharge into a vaporization unit. Spec. 3.

The Examiner found that McMEnamin discloses a vapor phase reagent dispensing apparatus comprising a vessel, a temperature sensor and a liquid reagent level sensor. Ans. 5. The Examiner also found that McMEnamin does not disclose a vessel with a sump cavity and the temperature and level sensors arranged as claimed. *Id.* The Examiner relies on Bouchard to teach a sump cavity in a vessel used to supply vapor to a deposition chamber. *Id.* at 6-7. The Examiner concluded that it would have been obvious to modify the vessel of McMEnamin to incorporate the sump cavity of Bouchard to increase the liquid utilization in the vessel as taught by Bouchard. *Id.* at 7-8. The Examiner also concluded that it would have been obvious to one skilled in the art to arrange the temperature and level sensors as claimed because it

would be a mere rearrangement of parts that do not modify the operation.
Id. at 8.

Appellant's claimed invention is directed to a sweep vapor phase reagent dispensing apparatus. App. Br. 7. Appellant argues that McMEnamin and Bouchard are directed to a bubbler vapor phase reagent dispensing system (*id.* at 13) and a dip tube liquid phase reagent dispensing system (*id.* at 14), respectively. Appellant argues that the Examiner relied on improper hindsight in relying on McMEnamin to meet the claimed invention because McMEnamin does not disclose the claimed internal configuration for the bubbler device. *Id.* at 13. Appellant additionally argues that McMEnamin and Bouchard teach away from the claimed invention because they include either a bubbler tube or a dip tube in their ampoule configuration. *Id.* at 13-15. Appellant further argues that the transitional language "consisting essentially of" in the claim distinguishes the claimed invention from McMEnamin by excluding the bubbler that allegedly materially affects the novel characteristics of the claimed dispensing device. *Id.* at 16.

We are unpersuaded by these arguments and agree with the Examiner's determination (Ans. 8) that one skilled in the art has the skill to recognize that locating the level sensor at the lowest point of a vessel would maximize the utilization of the liquid reagent within the vessel. *See In re Sovish*, 769 F.2d 738, 743 (Fed. Cir. 1985) (skill is presumed on the part of one of ordinary skill in the art); *In re Bozek*, 416 F.2d 1385, 1390 (CCPA 1969). We are also unpersuaded by Appellant's argument that the language "consisting essentially of" in the claim distinguishes the claimed invention from the device of McMEnamin. App. Br. 16. As correctly noted by the

Examiner, Appellant has not demonstrated that McMenamin's additional components would have materially different basic and novel characteristics when used to supply a vapor phase reagent to a deposition chamber. Ans. 35.

While Appellant argues that Bouchard is directed to a liquid phase reagent dispensing system (dip tube), Appellant has not adequately explained why one skilled in the art would not have modified the internal configuration of McMenamin in view of Bouchard's teachings. Moreover, Appellant's arguments that McMenamin cannot be modified according to Bouchard (App. Br. 12-13, 15) do not consider the Examiner's reasoning for combining the prior art. Our reviewing court has held that

[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

In re Keller, 642 F.2d 413, 425 (CCPA 1981). Appellant has not adequately explained why the vessel of McMenamin's vapor phase reagent dispensing system could not be modified to incorporate locating the level sensor at the lowest point of a vessel to maximize the utilization of the liquid reagent within the vessel as taught by Bouchard.

Accordingly, we sustain the Examiner's rejection of claims 1, 3-10, 12, 13 and 21 as unpatentable under 35 U.S.C. § 103(a) over McMenamin and Bouchard.

The Examiner separately rejected claims 2, 14, 22 and 23 over McMenamin, Bouchard and Ban and claim 11 over McMenamin, Bouchard

and Nguyen. Ans. 16-18. The Examiner relied on the additional secondary references to Ban and Nguyen to meet respective limitations of these claims. *Id.* In addressing these separate rejections, Appellant relies on the arguments presented when discussing independent claim 1. App. Br. 16-21. Further, Appellant did not substantively address or further distinguish the cited secondary references based on the additional limitations of the rejected claims. *Id.* Therefore, we affirm these rejections for the reasons given above and by the Examiner.

The Examiner also presented parallel rejections of claims 1-10, 12-14, and 21-23 as unpatentable under 35 U.S.C. § 103(a) over Ban, Bouchard and McMenamin and of claim 11 as unpatentable under 35 U.S.C. § 103(a) over Ban, Bouchard, McMenamin and Nguyen³. Ans. 19-33. We note that the prior art relied on by the Examiner in these rejections is the same as the prior art discussed above and that Appellant's line of argument for these rejections repeats issues already addressed above. App. Br. 21-23. Therefore, we direct Appellant's attention to our prior discussion on those issues. Accordingly, we sustain these rejections based on the same combination of prior art for the reasons given above and presented by the Examiner.

ORDER

The rejection of claims 1 through 14 and 21 through 23 under 35 U.S.C. § 103(a) is affirmed.

³ For the parallel rejections, the Examiner relied on Ban as the primary reference disclosing a vapor phase reagent dispensing apparatus comprising a vessel and a temperature sensor. Ans. 19-20.

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TIME PERIOD

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

AFFIRMED

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