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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte BRIAN Y. LIM,
THOMAS W. TOMBLER, JR., and JON W. LAI

Appeal 2010-006533
Application 10/613,513
Technology Center 3700

Before JAMES P. CALVE, SCOTT A. DANIELS, and
JEREMY M. PLENZLER, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the rejection of claims 1-18 and 29-55. App. Br. 2. Claims 19-28 are cancelled. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

CLAIMED SUBJECT MATTER

Claims 1 and 29 are independent. Claim 1 is reproduced below:

1. An apparatus for fabricating nanostructure-based devices on a workpiece comprising:
 - a stage for supporting the workpiece, wherein the workpiece includes multiple dies, each die having a catalyst on it;
 - a radiating-energy source, positioned above the stage to locally heat the catalyst on at least one die via simultaneously emitted multiple prongs of radiating energy; and
 - a feedstock delivery system for delivery of feedstock gas to the catalyst.

REJECTIONS¹

Claims 8 and 9 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 1-3, 6, 7, 9, 11-14, and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Colbert (US 6,756,026 B2; iss. Jun. 29, 2004) and Dai (WO 02/081366 A1; pub. Oct. 17, 2002).

Claims 4, 5, and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Colbert, Dai, and Glaser-Inbari (US 6,801,350 B2; iss. Oct. 5, 2004).

Claims 15-17 and 29-46 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Colbert, Dai, and Hong (US 2002/0127170 A1; pub. Sep. 12, 2002).

Claims 47-49 and 52-55 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Colbert, Dai, Hong, and Glaser-Inbari.

¹ The Examiner withdrew the rejection of claims 1-18 and 29-55 under 35 U.S.C. § 101 for claiming the same invention as claims 1-36 of Application 10/613,217 because Application 10/613,217 was abandoned. Ans. 9.

Claims 50 and 51 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Colbert, Dai, Hong, and Smalley (US 6,683,783 B1; iss. Jan. 27, 2004).

ANALYSIS

Claims 8 and 9 as indefinite

Claim 8

The Examiner found that claim 8 is indefinite because it is not clear how “a set of islands of catalyst” can be associated with one die. Ans. 3. The Examiner reasoned that claim 1 recites that each die has catalyst on it and having a catalyst cannot be a set of islands of catalyst. Ans. 8-9.

Appellants argue that a skilled artisan would understand that semiconductor fabrication involves patterned regions (e.g., islands) and an entire die or multiple dies can be patterned or a single die can have multiple regions patterned with catalyst. App. Br. 4. We agree. Appellants disclose that carbon nanotube structures are made by heating multiple catalyst loci (e.g., catalyst islands) on the work region. Spec. 1-2, para. [0003]; Spec. 9-10, para. [0023]. A skilled artisan would understand that catalyst islands are locations of catalyst and catalyst can be arranged in one or more islands on a die(s) of a workpiece. We cannot sustain the rejection of claim 8.

Claim 9

The Examiner found that claim 9 is indefinite because it is unclear from the limitation “all catalyst throughout die” how the catalyst is present on the die and whether the catalyst is on, in or near the dies or throughout the entire body of the die. Ans. 3, 9. Appellants argue that a skilled artisan would understand that an entire die can be patterned or multiple regions in a

single die can be patterned, if so desired, to contain catalyst. App. Br. 4. We agree. A skilled artisan would understand that catalyst on a die can be placed anywhere on the die. We cannot sustain the rejection of claim 9.

Claims 1-3, 6, 7, 9, 11-14, and 18 as unpatentable over Colbert and Dai

The Examiner found that Colbert discloses a system for making nanocomponents with a mounting element and carbon feedstock gas but does not teach multiple radiating energy beams. Ans. 4. The Examiner found that Dai discloses an apparatus for making carbon nanotubes with a substrate, gaseous carbonaceous feedstock, and localized heating zones 8 having multiple prongs as shown in Figure 1B. Ans. 4-5. The Examiner found that Dai's feed gas prongs 9 form multiple prongs of radiating energy through heat zone 8 to heat substrates in a radiating fashion. Ans. 9-10, 13.

Appellants argue that Dai heats blocks of substrates 1 by placing the substrates 1 on a heating element 2, and the gas distributor 9 merely allows carbon-containing material to be introduced into multiple localized heating zones 8 created by the heating element 2. App. Br. 6-7. We agree. The Examiner's finding that Dai's gas distributor 9 is a radiating-energy source that emits multiple prongs of radiating energy to heat catalyst on a die is not supported by a preponderance of evidence. Appellants disclose a radiating-energy source 34 that emits multiple prongs of energy that is preferably a laser, but may be other focusable radiating energy such as acoustic, radio frequency, infrared, microwave, and the like. Spec. 7, para. [0019]. Dai's gas distributor 9 corresponds to the claimed feedstock delivery system that delivers a gas to catalyst to the work region. Spec. 7, para. [0019]; Spec. 14, para. [0032]. We cannot sustain the rejection of claim 1 or its dependent

claims 2, 3, 6, 7, 9, 11-14, and 18. We also cannot sustain the rejection of claims 4, 5, and 10 as being unpatentable over Colbert, Dai, and Glaser-Inbari or the rejection of claims 15-17 as being unpatentable over Colbert, Dai, and Hong, because the Examiner's reliance on Glaser-Inbari to disclose features of claims 4, 5, and 10 and Hong to disclose features of claims 15-17 does not remedy the deficiencies of Colbert and Dai discussed *supra* as to claim 1 from which claims 4, 5, 10 and 15-17 depend.

Claims 29-46 as unpatentable over Colbert, Dai, and Hong

Claim 29 recites an apparatus with a stage, radiating energy source that heats a catalyst via multiple prongs of radiating energy, a feedstock delivery system, and a temperature control unit. The Examiner relied on Hong to disclose a temperature controller 500 for nanotube fabrication and Colbert and Dai to disclose the other features of claim 29, including the radiating energy source. Ans. 6-7, 14. Appellants argue that claim 29 recites substantially similar limitations as claim 1, so arguments presented for claim 1 apply to those limitations in claim 29. App. Br. 12. We agree. We cannot sustain the rejection of claim 29 or its dependent claims 30-46 because Colbert and Dai do not disclose a radiating energy source that heats catalyst via multiple prongs of radiating energy, for the reasons discussed *supra* for claim 1, and Hong does not cure that deficiency. See App. Br. 12.

Claims 47-49 and 52-55 as unpatentable over Colbert, Dai, Hong, and Glaser-Inbari and claims 50 and 51 as unpatentable over Colbert, Dai, Hong, and Smalley

Claims 47-55 depend from claim 29. The Examiner relied on Glaser-Inbari to disclose a beam splitter and Smalley to disclose an electric field generator. Ans. 7-8, 15. Neither reference remedies the deficiencies of

Appeal 2011-006533
Application 10/613,513

Colbert, Dai, and Hong as to claim 29. *See* App. Br. 14-15. We cannot sustain the rejection of claims 47-55.

DECISION

We REVERSE the rejections of claims 1-18 and 29-55.

REVERSED

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