



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
**United States Patent and Trademark Office**  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/443,249	03/29/2010	David L. Carroll	9151-79	7520

20792                      7590                      11/08/2016  
MYERS BIGEL, P.A.  
PO BOX 37428  
RALEIGH, NC 27627

EXAMINER
----------

EISEMAN, ADAM JARED

ART UNIT	PAPER NUMBER
----------	--------------

3736

MAIL DATE	DELIVERY MODE
-----------	---------------

11/08/2016

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

*Ex parte* DAVID L. CARROLL,  
FAITH M. COLDREN, NICOLE H. LEVI,  
LAWRENCE X. WEBB, WILLIAM D. WAGNER,  
THOMAS L. SMITH, BRIAN WERNER,  
J. BAXTER McGUIRT, and MANOJ NAMBOOTHIRY

---

Appeal 2015-002495  
Application 12/443,249  
Technology Center 3700

---

Before JENNIFER D. BAHR, JAMES P. CALVE, and  
BRANDON J. WARNER, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the final rejection of claims 1, 3–5, 7–16, 20, 22–24, 32, 34–36, and 44. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

### CLAIMED SUBJECT MATTER

Claims 1, 20, and 32 are independent. Claim 1 is reproduced below.

1. A method of sensing pressure in a region of interest, comprising:
  - (a) providing one or more sensor particles in said region, each of said sensor particles comprising: (i) a polymer support and (ii) a plurality of metallic particles operatively associated with said polymer support and one another, wherein said metallic particles sustain a plasmon upon excitation, and with said metallic particles configured so that the energy of said plasmon varies in response to pressure;
  - (b) measuring a physical property of said metallic particles that varies in response to pressure; and then
  - (c) determining the pressure in said region of interest from said detected physical property,
    - wherein said measuring step (b) is carried out by: (i) exciting said sensor particles to produce emitted light therefrom; (ii) detecting a property of said emitted light, wherein said property varies in response to said energy of said plasmon; and wherein: said determining step (c) is carried out by determining the pressure in said region of interest from said detected property.

### REJECTIONS<sup>1</sup>

Claims 1, 3–5, 7–13, 20, 22–24, 32, 34–36, and 44 are rejected under 35 U.S.C. § 103(a) as unpatentable over Wong (Ho and Wong, “Application of spectral surface plasmon resonance for gas pressure sensing,” IEEE 2002) and Lee (US 2008/0241262 A1, pub. Oct. 2, 2008), as evidenced by Jamiolkowski (US 2005/0113938 A1, pub. May 26, 2005) and Honiger (US 2004/0062809 A1, pub. Apr. 1, 2004).

Claims 14–16 are rejected under 35 U.S.C. § 103(a) as unpatentable over Wong, Lee, and Johnson (US 2006/0189910 A1, pub. Aug. 24, 2006).

---

<sup>1</sup> The Examiner withdrew the rejection of claims 3, 22, and 34 under 35 U.S.C. § 112, fourth paragraph. Ans. 8; *see* Final Act. 2.

## ANALYSIS

*Claims 1, 3–5, 7–13, 20, 22–24, 32, 34–36, and 44 as unpatentable over Wong and Lee*

The Examiner found that Wong teaches the claimed methods except for sensor particles comprising a polymer support. Final Act. 3–5. The Examiner found that Lee teaches a polymer support for metal nanoparticles that sustain a plasmon upon excitation, and the plasmon energy varies with pressure on the polymer support. *Id.* at 5. The Examiner determined that it would have been obvious to operatively associate Wong’s pressure sensor to Lee’s polymer support “to provide a support/carrier for the nanoparticles used for obtaining the measurement.” *Id.*; Ans. 9.

Appellants argue that it would not have been obvious to operatively associate Wong’s gold film with Lee’s polymer support because Wong and Lee measure pressure differently. Appellants argue that Wong measures the pressure of a gas that is exposed to a 50 nm gold film based on changes in the refractive index of the pressurized gas on the surface plasmon resonance of the gold film, whereas Lee disperses nano-particles in a polymer support and the nano-particles become conductive when compressed by pressure sufficient for electrical conduction to occur. Appeal Br. 5–6.

The Examiner’s articulated reason for combining Lee’s polymer support with Wong’s pressure sensor “to provide a support/carrier for the metallic nanoparticles used for obtaining the measurement” in Wong is not supported by rational underpinnings. The Examiner has not explained why a skilled artisan would have been motivated to operatively associate Wong’s gold film with Lee’s polymer support when Wong senses pressure using the surface plasmon response of a 50 nm gold film operatively associated with a prism that is optimized for this sensing application. Wong, 75 (¶¶ 3.1, 4).

Lee disperses metallic nanoparticles in a polymer support to sense pressure when the particles are compressed into close enough proximity to become conductive. Lee ¶ 159; Final Act. 5 (citing *id.*). It is not clear why a skilled artisan would have been motivated to support Wong's gold film in a polymer support when Lee teaches that this configuration senses pressure via electrical conduction, whereas Wong teaches the use of a sputtered gold film to sense pressure via a surface plasmon response. Appeal Br. 5–6. In addition, Wong sputters a 50 nm gold film onto a prism, which serves as a substrate for the gold film, to sense pressure of a gas film via changes in the surface plasmon response of the gold film. Wong, 75 (¶ 3.1). Moreover, it is not clear how the Examiner proposes to operatively associate Wong's gold film with Lee's polymer support or why a skilled artisan would be motivated to do so in these circumstances. Thus, we do not sustain the rejection of claims 1, 3–5, 7–16, 20, 22–24, 32, 34–36, and 44.

*Claims 14–16 as unpatentable over Wong, Lee, and Johnson*

The Examiner relied on Johnson to disclose features of claims 14–16, which depend from claim 1, but not to remedy deficiencies of Wong or Lee discussed above. *See* Final act. 7–8; Appeal Br. 7. Thus, we do not sustain the rejection of claims 14–16.

DECISION

We reverse the rejections of claims 1, 3–5, 7–16, 20, 22–24, 32, 34–36, and 44.

REVERSED