

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 31

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte GLENN L. HENDERSON, RANDAL A. HOKE,  
ANNE C. HOPKINS and  
DANIEL A. MCLAURIN

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Appeal No. 1997-2388  
Application No. 08/326,304<sup>1</sup>

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ON BRIEF

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Before ROBINSON, SPIEGEL and ADAMS , Administrative Patent Judges.  
SPIEGEL , 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, 4, 8, 9, 21, 23, and 25 as amended subsequent to the final rejection (see the

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<sup>1</sup> Application for patent filed October 20, 1994. According to appellants, this application is a continuation of application 07/934,847 filed August 25, 1992, now abandoned, which is a continuation of application 07/272,380 filed November 17, 1988, now abandoned.

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amendment filed January 11, 1996, Paper No. 25, entered as per the advisory action mailed February 7, 1996, Paper No. 27).

According to the specification,

the invention provides an assay for a viral antigen in which substantially all binding sites of a solid support are filled with an inert protein. Antigen capture onto the support containing inert protein is accomplished without a specific capture antibody and thereby avoids the time consuming and labor intensive step of producing specific capture antibody. The inert protein inhibits substantially all nonspecific binding of other protein, including tracer ... (page 5, lines 13-21).

Claims 1 and 21 are illustrative and read as follows:

1. A method for assay of a viral antigen in an aqueous liquid comprising:
  - a) combining a first aqueous liquid suspected of containing a viral antigen to be detected with a membrane precoated with albumin or casein but not with a specific capture antibody whereby said antigen is nonimmunologically absorbed onto the precoated membrane;
  - b) separating said membrane from said first liquid by causing said first liquid to pass through said membrane;
  - c) incubating said membrane having said viral antigen to be detected absorbed thereon with a tracer comprising an antibody and an enzyme selected from the group consisting of a cyclase, isomerase, peroxidase and hydrolase whereby said viral antigen to be detected absorbed on said precoated membrane binds to said tracer to give a bound fraction including said enzyme on said membrane;
  - d) passing a second aqueous liquid containing a substrate for said enzyme through said membrane, said substrate being converted by said enzyme on said membrane to a colored product; and
  - e) detecting said viral antigen by a signal associated with the color of said product.

21. A kit of materials for performing an assay for a viral antigen comprising a membrane precoated with albumin or casin [sic, casein] but not with a specific capture antibody, an antibody for the antigen to be

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detected having an enzyme conjugated thereto, a housing containing an

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absorbent material positioned adjacent said membrane, and a substrate for said enzyme, said enzyme being selected from the group consisting of a cyclase isomerase, peroxidase and hydrolase.

The references relied on by the examiner are:

Bagshawe	3,888,629	Jun. 10, 1975
Cole	4,342,826	Aug. 3, 1982
Int. Pat. App. (Ebersole)	WO 84/02193	Jun. 7, 1984

### ISSUES

Claims 1, 4, and 8 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ebersole. Claim 9 stands rejected under 35 U.S.C. § 103 as being unpatentable over Ebersole as applied to claim 1 in view of Cole. Claims 21, 23, and 25 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ebersole in view of Bagshawe. We REVERSE all three rejections.

In reaching our decision in this appeal, we have given careful consideration to the appellants' specification and claims and to the respective positions articulated by the appellants and the examiner. We make reference to the examiner's answer (Paper No. 30, mailed July 23, 1996) for the examiner's reasoning in support of the rejections and to the appellants' brief (Paper No. 29, filed April 4, 1996) for the appellants' arguments thereagainst.

OPINION

1. Rejection of claims 1, 4, and 8 under 35 U.S.C. § 103 over Ebersole

Ebersole discloses forming a labeled immune complex comprising analyte, e.g., a viral antigen, and enzyme-labeled antibody either (a) in solution by preincubating analyte with enzyme-labeled antibody, followed by collection on a support by filtration, or (b) directly on the support through immunochemical or nonimmunochemical capture of the analyte on the support, followed by reaction with enzyme-labeled antibody (page 8, lines 1-4 and 13-29; page 9, lines 8-23; page 21, lines 22-25). The support-bound enzyme label is contacted with an enzyme substrate(s) to produce a measurable, i.e., colored, product which is concentrated on the support and is indicative of the presence and amount of analyte (page 7, lines 32-36; page 8, lines 5-12). A porous or microporous support is preferred, although a variety of materials and physical forms can be used (paragraph bridging pages 10-11; page 11, lines 28-35). Anti-analyte antibodies or lectins are attached to the support to specifically capture, i.e., bind, analyte (page 14, lines 21-34); while nonimmunochemical capture occurs through physical forces, e.g., hydrogen bonding, van der Waals forces, and hydrophobic or ionic interactions, or can be mediated by non-specifically binding lectins on the support

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(page 13, lines 22-28; page 15, lines 5-11).<sup>2</sup> Nonspecific binding to the support is reduced or eliminated by pretreating the support with a dilute protein, e.g., albumin, solution (page 13, lines 9-14).

Appellants admit that Ebersole, in one passage or another, discloses the claimed elements, i.e., nonimmunological capture of analyte, albumin pretreated porous support, enzyme-labeled antibody and a method for assay of viral antigen, but argue that the broad disclosure in Ebersole does not disclose or suggest the claimed combination of elements (brief, page 5). We agree.

The examiner bears the initial burden of establishing a prima facie case of obviousness. To establish a prima facie case of obviousness, there must be both some suggestion or motivation to modify the reference or combine reference teachings and a reasonable expectation of success. In re Vaeck, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991). It is insufficient that the prior art discloses the components of the claimed invention, either separately or in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by appellants.

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<sup>2</sup> Ebersole states that

lectins can act in at least two different functions. In one mode of operation, a lectin can capture all of the microorganisms from a biological sample for which the lectin has specificity. In such a situation the anti-analyte antibody-enzyme conjugate acts to identify the microorganism sought. Alternatively, the lectin itself can serve to capture selectively the microorganism of interest (see footnote 2 above) [i.e., WGA, wheat germ agglutinin, can selectively capture *N. gonorrhoeae* without binding *N. meningitidis*]. The microorganism so immobilized on the active support can then be detected by the immunoassay of this invention. [Page 17, lines 1-11.]

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Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1985) (insufficient to select from the prior art the separate components of the inventor's combination, using the blueprint supplied by the inventor).

Here, the only place we find the suggested combination of nonimmunological capture, i.e., nonspecific binding, of analyte to an albumin pretreated porous support, enzyme-labeled antibody and a method for assay of viral antigen, is in appellants' specification. Example 6 appears to be the closest example of nonimmunological capture and detection of a viral antigen in Ebersole (pages 31-32).<sup>3</sup> In Example 6, an herpes virus (HSV) sample is absorbed onto a starch coated cotton swab<sup>4</sup> and the swab is then contacted with peroxidase-labeled anti-HSV antibody, washed and contacted with an iodide containing peroxidase substrate to generate a colored product indicative of viral concentration. Starch is a carbohydrate, not a protein like albumin.

Furthermore, the examiner has not established that one of ordinary skill in the art would have had a reasonable expectation of success that a support pretreated with albumin to saturate its nonspecific attachment sites would be useful for nonimmunological capture/nonspecific binding of analyte. Indeed, Bagshawe discloses that pretreating a

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<sup>3</sup> Ebersole's Example 13 (pages 43-45) also uses a starch coated cotton swab to assay for HSV. However, in that example Helix pomatia (HPA) lectin is used to specifically capture the HSV. See the Table on page 16 of Ebersole.

<sup>4</sup> According to Ebersole, "a starch-coated material ... can complex with iodine generated as the product of an enzyme-catalyzed reaction to yield a characteristic blue color on the support" (page 20, lines 26-29).

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support with albumin prevents nonspecific binding of antigen to the support (col. 3, lines 36-40).

Based on this record, we find that the examiner has relied on impermissible hindsight in making his determination of obviousness. In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992) (“It is impermissible to engage in hindsight reconstruction of the claimed invention, using the applicant’s structure as a template and selecting elements from references to fill the gaps”).

Accordingly, the rejection of claims 1, 4, and 8 rejected under 35 U.S.C. § 103 as being unpatentable over Ebersole is reversed.

2. Rejection of claim 9 under 35 U.S.C. § 103 over Ebersole and Cole

Cole discloses use of antigen/antibody tagged, enzyme encapsulating liposomes in an immunoassay (see e.g., abstract; col. 2, lines 22-32). We find nothing in Cole which makes up for the deficiencies in Ebersole. Accordingly, based on this record, the rejection of claim 9 under 35 U.S.C. § 103 as being unpatentable over Ebersole as applied to claim 1 in view of Cole is reversed.

3. Rejection of claims 21, 23, and 25 under 35 U.S.C. § 103 over Ebersole and Bashawe

According to the examiner, "Bagshawe was cited and relied upon only to provide a

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housing containing an absorbent material positioned adjacent to the membrane as is known in the art" (answer, page 6). Additionally, as to kit claims 21, 23, and 25, the examiner maintains "recitation of 'comprising a membrane precoated with albumin or casein but not with a specific capture antibody' does not exclude or preclude addition of a capture antibody at some time after the membrane pretreatment" (answer, paragraph bridging pages 5-6). However, as discussed above, the examiner has not established a reasonable expectation of success in later attachment of antibody to an albumin blocked support. Again, we find nothing in Bagshawe which makes up for the deficiencies in Ebersole. Therefore, based on this record, the rejection of claims 21, 23, and 25 under 35 U.S.C. § 103 over Ebersole in view of Bagshawe is reversed.

#### CONCLUSION

To summarize, the decisions of the examiner to (1) reject claims 1, 4, and 8 under 35 U.S.C. § 103 as being unpatentable over Ebersole, (2) to reject claim 9 under 35 U.S.C. § 103 as being unpatentable over Ebersole as applied to claim 1 in view of



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APJ SPIEGEL

APJ ROBINSON

APJ ADAMS

DECISION: **REVERSED**

Prepared By: Cheryl

**DRAFT TYPED:** 29 Jun 00

**FINAL TYPED:** July 5, 2000/cam