

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The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte MAXIMILIAN FLEISCHER  
and HANS MEIXNER

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Appeal No. 1996-0841  
Application 07/928,443

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HEARD: Jan. 24, 2000

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Before GARRIS, PAK, and OWENS, Administrative Patent Judges.

PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 1 through 33 which are all of the claims pending in the application.

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Claim 1 is representative of the subject matter on appeal  
and reads as follows:

1. In a gas sensor array for detecting individual gas constituents in a gas mixture, said array being composed of a plurality of individual sensor elements, which are the basis of semiconductive metal oxides, said individual sensor elements being respectively applied on an electrically non-conductive substrate, with the array being provided with a contact electrode arrangement for measuring the electrical conductivity of each element, the array being provided with a heating arrangement for heating at a predetermined operating temperature with a protective sheath that protects the array against external mechanical influences and a fastening base wherein the individual sensor elements have prescribed individual operating temperatures allocated to them and wherein differences between the respective sensor signals are formed for detecting the individual gas constituents, with these differences being supplied to a processing unit, the improvements comprising at least one of the individual sensor elements comprising a catalytically inactive  $S\text{-Ga}_2\text{O}_3$  thin film being provided with a catalytically active material, and with all the individual sensor elements being provided on a common substrate in a planar arrangement.

As evidence of obviousness, the examiner relies on the following prior art:

Firth et al. (Firth) 1977	4,057,996	Nov. 15,
Leary 1982	4,347,732	Sep. 7,
Clifford 24, 1985	4,542,640	Sep.
Takahashi et al. (Takahashi) 4, 1986	4,574,264	Mar.
Forster 1986	4,584,867	Apr. 29,

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Matsuura et al. (Matsuura) Re. 33,980 Jun. 30, 1992

Smith et al. (Smith) 1 562 623 Mar. 12,  
1980  
(Published Great Britain Patent Application)

Micheli et al. (Micheli), "Tin Oxide Gas Sensing Microsensors From Metallo-Organic Deposited (MOD) Thin Films," Ceram. Eng. Sci. Proc., Vol. 8, pp 1095-1105 (1987).

The appealed claims stand rejected as follows:

(1) Claims 1 through 3, 5 through 24 and 30 under 35 U.S.C.

§ 103 as unpatentable over Clifford in view of Firth;

(2) Claim 4 under 35 U.S.C. § 103 as unpatentable over Clifford and Firth as applied to claims 1 through 3, 5 through 24 and 30 above, and further in view of Takahashi;

(3) Claims 24 through 28 and 30 under 35 U.S.C. § 103 as unpatentable over Clifford and Firth as applied to claims 1 through 3, 5 through 24 and 30 above, and further in view of Forster;

(4) Claim 29 under 35 U.S.C. § 103 as unpatentable over Clifford and Firth as applied to claims 1 through 3, 5 through 24 and 30 above, and further in view of Leary;

(5) Claims 31 and 32 under 35 U.S.C. § 103 as unpatentable over Clifford and Firth as applied to claims 1 through 3, 5

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through 24 and 30 above, and further in view of Smith and Matsuura; and

(6) Claim 33 under 35 U.S.C. § 103 as unpatentable over Clifford and Firth as applied to claims 1 through 3, 5 through 24 and 30 above, and further in view of Micheli and Forster.

Having carefully reviewed the claims, specification and applied prior art, including all of the arguments advanced by both the examiner and appellants, we agree with appellants that the examiner has not established a *prima facie* case of obviousness regarding the claimed subject matter. Therefore, we reverse each of the foregoing § 103 rejections for essentially those reasons set forth by appellants in their Brief and Reply Briefs. We add the following primarily for emphasis.

The appealed subject matter as represented by the broadest claim on appeal, claim 1, is directed to an improved gas sensor array composed of a plurality of individual sensor elements for detecting individual gas constituents in a gas mixture. The improvement lies in using

at least one of the individual sensor elements comprising a catalytically inactive  $S\text{-Ga}_2\text{O}_3$  thin film being provided with a catalytically active material, and with all the individual sensor elements being

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provided on a common substrate in a planar arrangement.<sup>1</sup>

The examiner has relied only on Clifford and Firth to establish obviousness of the broadest appealed subject matter which is embraced by all of the claims on appeal. Thus, the dispositive question here is whether the combined disclosures of Clifford and Firth would have suggested to a person having ordinary skill in the art to employ a catalytically inactive beta-gallium oxide film together with a catalytically active material to form at least one of the individual sensor elements for detecting individual gas constituents in a gas mixture. Compare Answer, pages 4-7, with Brief, pages 6-11. We answer this question in the negative.

It is well settled that "the examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a prima facie case of unpatentability." *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). The burden of producing a factual basis to support a Section 103 rejection rests on the examiner. *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 177-78 (CCPA 1967).

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<sup>1</sup> See claim 1.

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In the present case, we determine that the examiner has not supplied a sufficient factual basis to employ "catalytically inactive" beta-gallium oxide with a catalytically active material to form at least one individual sensor element. As stated by the examiner (Answer, page 5), Firth teaches employing gas sensitive resistors consisting essentially of gallium oxide. See column 1, lines 57-59. This gallium oxide is suggested over other so-called "catalytic metal oxides," such as titanium dioxide, vanadium pentoxide, chromium oxide and cerium oxide. See Firth, column 2, lines 32-56, together with Clifford, column 7, line 65 to column 8, line 5. According to Firth (column 2, lines 42-56), the catalytic metal oxides exhibit a characteristic which is

ill-adapted for use where it is required to provide for fine adjustment of the composition of the inlet mixture, especially in the important range of "lean" mixtures.

Moreover, Firth does not indicate that the gallium oxide employed is catalytically inactive or is in beta form. See Firth in its entirety. Nor does it indicate that a catalytically inactive film can be used together with a catalytically active material. *Id.*

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The examiner's reliance on Clifford does not remedy the deficiencies of Firth. Clifford describes various gas sensors which employ a combination of catalytic metal oxide materials. See column 7, line 65 to column 8, line 53. Clifford indicates that particular catalytic metal oxides known as "activators" can be included in particular catalytic metal oxide films to improve their detection of particular gases. See column 8, lines 11-64. Nowhere does Clifford indicate that those "activators" can be used together with a catalytically inactive beta-gallium oxide film to enhance the detection of any particular gas. See Clifford in its entirety.

Given these circumstances, we cannot agree with the examiner that the combined disclosures of Clifford and Firth would have rendered the claimed subject matter *prima facie* obvious to one of ordinary skill in the art. Accordingly, we reverse the examiner's decision rejecting all of the appealed claims under 35 U.S.C. § 103.

REVERSED

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	Bradley R. Garris	)	
	Administrative Patent Judge	)	
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	Chung K. Pak	)	BOARD OF
PATENT		)	
	Administrative Patent Judge	)	APPEALS AND
		)	INTERFERENCES
		)	
		)	
	Terry J. Owens	)	)
	Administrative Patent Judge	)	

CKP:tdl

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