Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte DOMINGO A. FIGUEREDO

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Appeal No. 2000-2060
Application 08/568,209

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ON BRIEF

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Before BARRETT, FLEMING, and RUGGIERO, Administrative Patent Judges.

FLEMING, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-6, 8-14, 16-20 and 22.[1]

The invention relates to a drive head and a method for fabricating a drive head for a thermal ink-jet printhead device. The drive head includes a transistor (32), a heat transducer or a resistor (26) and a multi-functional layer (46) having a first

[1] Claim 7 was canceled in Paper No. 8, and claims 15 and 21 were canceled in Paper No. 12.

portion that functions as a channel (46b) of the transistor and having a second portion that functions as a portion (46e) of the heat transducer or the resistor. See Appellant's specification, page 5, lines 18, and 20, page 7, lines 13-14 and associated figures 1 and 2E. The method comprises providing a substrate (40), attaching to the substrate a transistor (32) and a resistor (26) and inter-connecting the transistor with an uninterrupted layer (46) of conductive material so that a first portion of the layer functions as a channel (46b) of the transistor and a second portion (46e) of the layer functions as the resistor. See Appellant's specification, page 6, lines 14-16, page 7, lines 3-10 and 13-16 and associated figures 1 and 2E.

Independent claims 1 and 18 present in the application are representative and reproduced as follows:

1. A drive head for a thermal ink-jet printhead device comprising:

a transistor;

a heat transducer; and

a multi-functional layer having a first portion that functions as a channel of the transistor and having a second portion that functions as a portion of the heat transducer.

18. A method for fabricating a drive head for a thermal ink-jet printhead device comprising the steps of:

providing a substrate;

attaching to the substrate a transistor and a resistor; and

inter-connecting the transistor with an uninterrupted layer of conductive material so that a first portion of the layer functions as a channel of the transistor and a second portion of the layer functions as the resistor.

References

The reference relied on by the Examiner are as follows:

Hess et al. (Hess)	5,122,812	Jun. 16, 1992
Tango	4,288,829	Sept. 8, 1981
Hawkins et al. (Hawkins)	5,081,473	Jan. 14, 1992

Rejection at Issue

Claims 1-6, 8-14, 16-20 and 22[2] stand rejected under 35 U.S.C. § 103 as being unpatentable over Hess in view of Tango and Hawkins.

[2] The Examiner has mistakenly stated on page 3 that claims 1-22 are rejected as being unpatentable over Hess in view of Tango and Hawkins. Additionally, Appellant states in footnote 2 of Appeal Brief, Paper No. 18, that claims 1-14, 16-20 and 22 are in the application. However claim 7 was canceled in Paper No. 8 and has not been included in Appendix of the claims of Paper No. 18. Claims 15 and 21 were canceled in Paper No. 12.

Rather than repeat the arguments of Appellant and the Examiner, we make reference to the Briefs[3] and the Answer for the respective details thereof.

OPINION

With full consideration being given the subject matter on appeal, the Examiner's rejections and the arguments of Appellant and Examiner, for the reasons stated *infra*, we will not sustain the Examiner's rejection of claims 1-6, 8-14, 16-20 and 22 under 35 U.S.C. § 103.

The Examiner argues that Hess discloses all the elements found in claims 1-6, 8-14, 16-20 and 22, except for "a multi-functional layer having a first portion that functions as a channel of the transistor" as recited in independent claim 1, "an uninterrupted layer of conductive material inter-connected between and forming at least a part of the transistor and the

[3] Appellant filed an appeal brief on June 1, 1999, Paper No. 18. In response to the Examiner's Answer, Paper No. 19, mailed August 3, 1999, the Appellant filed a Reply Brief on October 7, 1999, Paper No. 20. The Examiner mailed an office communication on December 30, 1999, stating that the reply brief has been entered.

resistor and wherein preselected portions of the uninterrupted layer of conductive material are doped at different levels such that a first portion of the layer functions as a channel of the transistor" as recited in independent claim 13, or the step of "inter-connecting the transistor with an uninterrupted layer of conductive material so that a first portion of the layer functions as a channel of the transistor" as recited in independent claim 18. See Examiner's Answer, Page 4, lines 15-20. To provide a motivation for the above deficiencies, the Examiner relies on Tango and Hawkins.

The Examiner states that Tango teaches a MOS integrated circuit having a poly-silicon layer with both a channel region of the transistor and a resistor formed by doping the silicon layer differently in order to reduce the size. See Examiner's Answer, page 5, lines 1-5. The Examiner also cites Hawkins to teach using a poly-silicon resistor in an ink-jet printhead. See Examiner's Answer, Page 5, lines 8-9 and 11-12. The Examiner then concludes that it would have been obvious to one skilled in the art to provide a poly-silicon resistor in the Hess device in order to eject ink, as taught by Hawkins, and to form the

polysilicon resistor taught by Hawkins in the same layer as the channel of a MOS transistor, as taught by Tango, in order to improve performance of the chip and to provide an electrical connection. See Examiner's Answer, Page 5, lines 10-15.

Appellant argues that the Examiner has not established a *prima facie* case of obviousness with respect to the claims. Appellant disputes that a portion of layer 80 of Hess functions as a channel of the transistor. See Appeal Brief, Page 7, lines 25-26. Appellant also asserts that the resistor in Tango is not a heat transducer but rather is part of a protective circuit that prevents the gate electrode of the MOS transistor from being destroyed. See Appeal Brief, Page 6, lines 20-23. Additionally, Appellant disputes that Tango and Hawkins provide a motivation to modify the Hess device since Tango relates to safety circuits and Hawkins relates to reducing warm-up time for a printhead. See Appeal Brief, Page 6, lines 27-28. As such, Appellant argues that there is no motivation to combine the teachings of Tango and Hawkins with Hess to meet the limitations found in the claims. See Appeal Brief, Page 6, lines 25-27.

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a *prima facie* case of obviousness. **In re Oetiker**, 977 F.2d 1443, 1445, 24 USPQ 1443, 1444 (Fed Cir. 1992). See also **In re Piasecki**, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed Cir. 1984). The Examiner can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. **In re Fine**, 87 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. **Oetiker**, 977 F.2d at 1445, 24 USPQ at 1444. See also **Piasecki**, 745 F.2d at 1472, 223 USPQ at 788.

The factual inquiry whether to combine references under 35 U.S.C. § 103 must "be based on objective evidence of record." **In re Lee**, 277 F.3d 1338, 1343, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002). This "showing must be clear and particular." **In re Dembiczak**, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). "In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select

the references and combine them to render the claimed invention obvious." **In re Lee**, 277 F.3d at 1343, 61 USPQ2d at 1434 quoting **In re Fritch**, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992). See also **Dembiczak**, 175 F.3d at 999, 50 USPQ2d at 1617 quoting **In re Rouffet**, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998). "[T]he Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion." **In re Lee**, 277 F.3d at 1344, 61 USPQ2d at 1434. With these principles in mind, we commence review of the pertinent evidence and arguments of Appellant and Examiner.

The Examiner acknowledges that Hess does not disclose the multi-functional or uninterrupted layer having a first portion that functions as a channel of the transistor as recited in claims 1 and 18 or portions of an uninterrupted layer being doped at different levels such that the a first portion functions as the channel of the transistor as recited in claim 13. See Examiner's Answer, Page 4, lines 15-20. As such, we must

determine whether one skilled in the art would have been motivated to look to Tango and Hawkins in order to teach the limitations missing from Hess.

Upon a careful review, we fail to find that the Examiner has provided the evidence to show why one of ordinary skill in the art would combine the Tango multi-functional layer in the Hess device. First, while Hawkins provides a teaching of using a polysilicon resistor in the ink-jet printhead art, there is no teaching in Hawkins to use a multi-functional or uninterrupted layer having a first portion that functions as a channel of the transistor as recited in claims 1 and 18 or portions of an uninterrupted layer being doped at different levels such that a first portion functions as the channel of the transistor as recited in claim 13.

Second when reviewing Tango, we find a discussion of having the channel region of the transistor and the resistor in the same layer. See Figure 7, column 3, lines 29-32 and 41-43, and column 4, lines 22-26. Additionally, Tango discusses in column 3, lines 56-59 a doping method to obtain a specific resistance for the resistor. However, an analysis under 35 U.S.C. § 103 requires a "reason, suggestion, or motivation found in the prior art whereby

a person of ordinary skill in the field of the invention would make the combination." **In re Oetiker**, 977 F.2d at 1446, 24 USPQ2d at 1447. We find no such reason or motivation in Tango for one of ordinary skill in the art to make the combination with Hess and Hawkins.

Tango deals with an improved protective circuit designed to protect a MOS integrated transistor from being destroyed by an irregular input pulse. See Tango, column 2, lines 24-27. Tango discloses in column 4, lines 17-28 and 40-59 that the transistor and resistor can be arranged in the same layer in order to decrease stray capacitance. However, there is no discussion in Tango about combining its teachings with the driver circuitry (MOSFET transistors) of a drive head for a thermal ink-jet printhead, like the Hess device, or the polysilicon resistor of a thermal ink-jet printing chip taught by Hawkins.

Third, Tango does not discuss forming the transistor and resistor in the same layer *in order to reduce the size of the semi-conductor chip* as the Examiner states on page 5, lines 2 through 4 of the Examiner's Answer or forming the channel of the transistor in the same layer of the resistor *in order to improve*

performance of the chip and to provide an electrical connection as the Examiner states on page 5, lines 13 through 15 of the Examiner's Answer. "[C]onclusory statements . . . do not adequately address the issue of motivation to combine." **In re Lee**, 277 F.3d at 1343, 61 USPQ2d at 1434. Thus, we fail to find that the Examiner has provided the requisite findings based on objective evidence to combine Tango with Hess and Hawkins.

Lastly, the Examiner has not relied on Hawkins to meet the limitations of a multi-functional layer having a first portion that functions as a channel of the transistor, an uninterrupted layer of conductive material inter-connected between and forming at least a part of the transistor and the resistor and wherein preselected portions of the uninterrupted layer of conductive material are doped at different levels such that a first portion of the layer functions as a channel of the transistor, or the step of inter-connecting the transistor with an uninterrupted layer of conductive material so that a first portion of the layer functions as a channel of the transistor. As such, we cannot sustain the obviousness rejection of claims 1, 13 and 18.

Since claims 2-6, 8-12, 14, 16-17, 19-20 and 22 are dependent on independent claims 1, 13 and 18, we also cannot sustain the art rejections of these claims.

In conclusion, we find the Hess reference in combination with Tango and Hawkins fail to disclose, teach or suggest a multi-functional layer having a first portion that functions as a channel of the transistor as recited in claim 1, an uninterrupted layer of conductive material inter-connected between and forming at least a part of the transistor and the resistor and wherein preselected portions of the uninterrupted layer of conductive material are doped at different levels such that a first portion of the layer functions as a channel of the transistor as recited in claim 13, or the step of inter-connecting the transistor with an uninterrupted layer of conductive material so that a first portion of the layer functions as a channel of the transistor as

recited in claim 18. Therefore, we cannot sustain the rejection of independent claims 1-6, 8-14, 16-20 and 22 under 35 U.S.C. § 103.

REVERSED

LEE E. BARRETT Administrative Patent Judge	)	
MICHAEL R. FLEMING Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
JOSEPH F. RUGGIERO Administrative Patent Judge	)	

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