Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FERNANDO GONZALEZ, GURTEJ S. SANDHU and MIKE P. VIOLETTE

Appeal No. 2001-0113
Application No. 08/604,751

ON BRIEF

Before FLEMING, LALL, and GROSS, ***Administrative Patent Judges.***

FLEMING, ***Administrative Patent Judge.***

DECISION ON APPEAL

Background

Appellants' invention relates to a memory device comprising a first conductive plug (125) having a first type conductivity and having a width approximately equal to a minimum photolithographic limit (F). See Appellants' specification, Fig. 11A and Fig. 11B, and also page 13, lines 3-7 and page 14, line 24 through page 15, line 2. A second conductivity plug (170) having a second conductivity (See Appellants' specification, page 16, lines 10-21 and

Fig. 16) and an insulative spacer (150) are interposed between the first (125) and second (170) conductivity plugs. The total width of the second conductive plug (170) and insulative spacer (150) is approximately no greater than a minimum photolithographic limit (F). See Appellants' specification, Fig. 14 and Fig. 11B, and also page 15, line 22 through page 16, line 7.

Claims 12 and 13 are the only claims pending before us on appeal. Claims 12 and 13 are reproduced as follows:

12. A memory device, comprising:

a first conductive plug having a first type conductivity and having a width approximately equal to a minimum photolithographic limit;

a second conductive plug having a second type conductivity; and

an insulative spacer interposed between said first and said second conductive plugs wherein a total width of said second conductive plug and said spacer is approximately no greater than a minimum photolithographic limit.

13. A memory device, comprising:

two first conductive plugs having a first type conductivity distanced one from the other by a maximum distance approximately equal to a minimum photolithographic limit;

a second conductive plug having a second type conductivity, said second conductive plug interposed between said two first conductive plugs; and

an insulative spacer interposed between said second conductive plug and said two first conductive plugs wherein a total width of said second conductive plug and said spacer is no greater than said minimum photolithographic limit.

References

The reference relied on by the Examiner is as follows:

Juengling	5,700,706	Dec. 23, 1997 (filed Dec. 15, 1995)

Rejections at Issue

Claims 12 and 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Juengling.[1]

Opinion

With full consideration being given to the subject matter on appeal, the Examiner's rejections and arguments of the Appellants

[1] In the Examiner's Answer, the Examiner stated that "the 35 U.S.C. § 112 rejection has been suspended." Appellants argue in the Reply Brief that the Board should nevertheless address the § 112 rejection because "suspended" does not mean the rejections were withdrawn. Although the Examiner did not use the proper terminology, we find that the Examiner did withdraw the § 112 rejection and therefore the issue is not properly before us.

and Examiner, we affirm the rejection of claim 12 and reverse the rejection of claim 13, which were both rejected under 35 U.S.C. § 103. Claims 12 and 13 differ substantially in scope, and therefore we will first address Appellants' arguments with regards to claim 12.

Appellants argue in the Appeal Brief that Juengling does not disclose nor suggest having a "first conductive plug having a width approximately equal to a minimum photolithographic limit" as recited in claim 12. See Appeal Brief, Paper No. 21, page 9, lines 1-6. Appellants further support this assertion in the Reply Brief, where they argue that Column 6, lines 64-67 of Juengling, which teaches "the first polysilicon layer 56 has to fill only the plugs connecting to the cell capacitors in the array, which are typically less than 0.4 micrometers wide," does not anticipate the claim language. The Appellants argue that the grammatical structure of the sentence implies that the cell capacitors, not the plugs, are 4 micrometers, or 4,000 angstroms wide. See Appellants' Reply Brief, Paper No. 23, page 3, paragraph 4, line 6 through page 4, line 7. The Appellants further contest the Examiner's obviousness rejection because 4,000 angstroms is not "approximate" to 3,000 angstroms. The

Appellants state that the term "approximate" should only allow for tolerances in measurement equipment that range only in a few percent. See Appellants Reply Brief, Paper No. 23, page 4, lines 7-21.

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.

An obviousness analysis commences with a review and consideration of all the pertinent evidence and arguments. "In reviewing the [E]xaminer's decision on appeal, the Board must

necessarily weigh all the evidence and arguments." ***In re Oetiker***, 977 F.2d at 1445, 24 USPQ2d at 1444. "[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 1338, 1344, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002). With these principles in mind, we commence review of the pertinent evidence and arguments of Appellants and Examiner.

Upon review of the reference as a whole, we find that Juengling teaches "a first conductive plug having a first type conductivity and having a width approximately equal to a minimum photolithographic limit" as recited in claim 12. In column 2, lines 25-30, Juengling teaches that the minimum photolithographic limit is 3000 angstroms. Further in column 6, lines 50-55, Juengling teaches that layer 56 has a thickness in a range of 1500 angstroms to 4000 angstroms. Since 3000 angstroms is within the range of 1500 angstroms to 4000 angstroms, "a first conductive plug having a first type conductivity and having a width approximately equal to a minimum photolithographic limit" as recited in claim 12 at least would have been obvious in view

of Juengling. See In re Malagari, 499 F.2d 1297, 1302, 182 USPQ 549, 553 (CCPA 1974).

We appreciate Appellants' arguments that the grammatical structure of column 6, lines 64-67 may be interpreted to mean that the cell capacitors, not the plugs, are 4,000 angstroms wide and further that 4000 angstroms is not approximate to 3000 angstroms. However, the sentence referred to should be read in the context of the entire document which includes column 6, lines 50-55, where Juengling teaches a range of thicknesses for plug 56 which includes the minimum photolithographic limit of 3000 angstroms and therefore renders obvious the claimed thickness.

We now proceed to address independent claim 13, which recites "two first conductive plugs having a first type conductivity distanced one from the other by a maximum distance approximately equal to a minimum photolithographic limit." Thus, claim 13 requires the formation of two plugs, both having the same conductivity type, formed at a distance no greater than "F", which is the minimum photolithographic limit. See Appellants' specification, Fig. 14 and Fig. 11B, and also page 15, line 22 through page 16, line 7.

The Examiner rejects claim 13 under 35 U.S.C. § 103 as being obvious in view of Juengling. In particular, the Examiner relies on Juengling's memory cell structure depicted in Figure 10 which includes a first plug of a first conductivity type (56), a second plug of a second conductivity type (104), and an insulative spacer (46 and 64) interposed between. The Examiner further relies on column 2, lines 25-30 of Juengling, which states that the minimum photolithographic limit is 3000 angstroms. The Examiner asserts that it would have been obvious to one of ordinary skill in the art that the memory cell structure of Figure 10 would repeat to the side of Fig. 10 in order to fabricate a memory device. The repeated memory cell structure would include a second first conductivity type plug (56) and thereby anticipates the Appellants' claimed language. See Examiner's Answer, Paper No. 22, page 6, lines 11-16. The Examiner does not address how the repeated memory cell structure of Figure 10 anticipates forming plugs (56) at a distance no greater than the minimum photolithographic limit.

In response to the Examiner's rejection, the Appellants argue that even if it would have been obvious to repeat the memory cell structure of Figure 10, the repeated memory cell

structure does not anticipate claim 13 because the repeated memory cell would still fail to include two plugs (56) separated by a maximum distance approximately equal to a minimum photolithographic limit. See Appeal Brief, Paper No. 21, page 9, lines 17 through page 10, lines 6.

Upon review, even if we found that it would have been obvious to repeat the memory cell structure taught by Juengling in Figure 10 in order to form a memory device, the repeated memory cell structure still fails to teach the spacing limitation of claim 13 which is "two first conductive plugs having a first type conductivity distanced one from the other by a maximum distance approximately equal to a minimum photolithographic limit." In contrast, Juengling's Figure 10 shows that the memory cell structure has a series of at least three second conductivity plugs (104) formed after first conductive plug (56). Juengling further teaches on column 6, lines 60-6, that each plug (104) has a thickness between 3,000 to 8,000 angstroms. Thus, when the memory cell structure is repeated, the distance between first conductive plugs (56) would include the width of at least three second conductivity plugs (104); this totals a minimum distance of 9,000 to 24,000 angstroms. Therefore, the distance between

two first conductivity plugs (56) is much greater than Juengling's minimum photolithographic limit, which is 3,000 angstroms. See Juengling Fig. 1, layers 56 and 104 and also Column 2, lines 25-30. Consequently, the Examiner's § 103 rejection of claim 13 based on Juengling is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

MICHAEL R. FLEMING Administrative Patent Judge	)
PARSHOTAM S. LALL Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
ANITA PELLMAN GROSS Administrative Patent Judge	)

MRF/lbg

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