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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HAIYAN GONG, LEI WANG, SING-RONG LI,
HWONG-KWO LIN, and PAI-YI CHANG

Appeal 2019-003692
Application 14/160,706
Technology Center 2800

Before CATHERINE Q. TIMM, MONTÉ T. SQUIRE, and
MERRELL C. CASHION, JR., *Administrative Patent Judges*.

CASHION, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant¹ appeals under 35 U.S.C. § 134(a) from the Examiner's Final Rejection of claims 1–20. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM IN PART.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies NVIDIA Corporation as the real party in interest. Appeal Br. 3.

The invention is directed to a negative bit line write assist system (apparatus) and a negative bit line write assist method. Spec. ¶ 1. Claim 1 illustrates the invention:

1. A negative bit line write assist system, comprising:

an array voltage supply;

a static random access memory (SRAM) cell that is coupled to the array voltage supply and controlled by bit lines during a write operation; and

a bit line voltage unit that is coupled to the SRAM cell, wherein:

a distributed capacitance is controlled by a single write assist command to provide generation of a negative bit line voltage during the write operation,

said bit line voltage unit including a write assist grounding switch and write assist buffer circuit,

said single write assist command applied to said write assist buffer circuit to provide a charging voltage to said distributed capacitance,

said single write assist command also applied to said write assist grounding switch, and

said distributed capacitance is a fringing capacitance in an upper metal layer of an array of said SRAM cells.

Independent claim 11 is directed to a negative bit line write assist method using essentially the negative bit line write assist system of claim 1.

Appellant (Appeal Br. 4–5) requests review of the following rejections from the Examiner’s Final Office Action:

I. Claims 2–6 and 12–16 rejected under 35 U.S.C. § 112(b) as indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor regards as the invention.

II. Claims 1–20 rejected under 35 U.S.C. § 103 as unpatentable over Wu (US 8,174,867 B2, issued May 8, 2012) and Turner (US 2004/0233701 A1, published November 25, 2004).

OPINION

After review of the positions the Appellant provides in the Appeal and Reply Briefs and the Examiner provides in the Final Action and the Answer, we AFFIRM the Examiner’s rejection of claims 2–6 and 12–16 rejected under 35 U.S.C. § 112(b) for the reasons the Examiner presents, but REVERSE the Examiner’s prior art rejection of claims 1–20 under 35 U.S.C. § 103 for the reasons Appellant presents. We add the following for emphasis.

REJECTION UNDER § 112(b) - Indefiniteness

The text of 35 U.S.C. § 112 (b) requires “[t]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.” “As the statutory language of ‘particular[ity]’ and ‘distinct[ness]’ indicates, claims are required to be cast in clear—as opposed to ambiguous, vague, indefinite—terms.” *In re Packard*, 751 F.3d 1307, 1313 (Fed. Cir. 2014). Thus, the test for determining the question of indefiniteness may be formulated as whether the claims “set out and circumscribe a particular area with a reasonable degree of precision and particularity.” *In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971). With

regard to the reasonableness standard, one must consider the language in the context of the circumstances. *Packard*, 751 F.3d at 1313. Language is an imprecise method of drawing boundaries delineating patent rights, thus unreasonable precision cannot be demanded. *Id.* On the other hand, the claims must notify the public of what they are excluded from making and using. *Id.* For this reason, while exact precision is not required, an applicant is required to use language as precise as the subject matter reasonably permits. *Id.*

We first note that the Examiner rejects claims 6 and 16 as indefinite because the claims recite the language “wherein the distributed capacitance includes a fringing capacitance.” Final Act. 3. According to the Examiner, the noted recitation of the claims is redundant because independent claims 1 and 11 already recite it. *Id.* Appellant does not present any arguments addressing the rejection of these claims. *See generally* Appeal Br. and Reply Br.; Ans. 3–4. Accordingly, we summarily affirm the rejection of these claims.

The Examiner additionally rejects claims 2 and 12 as indefinite because the claims recite that the “distributed capacitance includes an upper metal coupling capacitance.” Final Act. 2. According to the Examiner, independent claims 1 and 11 recite that the distributed capacitance *is* a fringing capacitance in an upper metal layer. *Id.* at 2–3. The Examiner contends that one skilled in the art would be unable to ascertain the scope of these claims because it is not clear whether the distributed capacitance is generated from an upper metal coupling or it is limited to just fringing capacitances. *Id.* at 3.

Appellant argues that claims 2 and 12 recite that the claimed distributed capacitance includes both, the fringing capacitance of claims 1 and 11 as well as an upper metal coupling capacitance. Appeal Br. 5. That is, Appellant argues that claims 2 and 12 include the fringing capacitance and an additional upper metal coupling capacitance other than a fringing capacitance.

Appellant's argument does not identify error in the Examiner's determination of indefiniteness.

As the Examiner notes, the independent claims recite that the distributed capacitance *is* the fringing capacitance. Ans. 7. In fact, the Specification discloses that the “distributed capacitances are typically fringing capacitances in an upper metal layer of the SRAM array or memory.” Spec ¶ 21. Thus, the Specification only identifies fringing capacitances as being distributed capacitances. There is no disclosure of what capacitances other than fringing capacitances could be distributed capacitances. Therefore, we agree with the Examiner that the language of the independent claims limits the distributed capacitance to just the fringing capacitance. *Id.* While Appellant asserts that dependent claims 2 and 12 includes an additional upper metal coupling capacitance, Appellant does not direct us to any portion of the Specification or provide an adequate explanation in support of this assertion. *See generally* Appeal Br. Thus, the claim language, when read in light of the written description, is confusing. *In re Cohn*, 438 F.2d 989, 1001 (CCPA 1971) (holding claims indefinite based on an inconsistency in meaning when the claim is read in light of the disclosure).

Moreover, the language of the independent claims recites that the “distributed capacitance is a fringing capacitance in an upper metal layer of an array of [] SRAM cells.” Thus, the fringe capacitance would meet dependent claims 2 and 12 recitation of a “distributed capacitance [that] includes an upper metal coupling capacitance.” This raises the same issue that the Examiner pointed out with respect to claims 6 and 16, namely, that claims 2 and 12 do not further limit the subject matter of independent claims 1 and 11.

Accordingly, on this record, claims 2–6 and 12–16 are indefinite for the reasons the Examiner presents and we give above.

REJECTION UNDER § 103

After review of the respective positions the Appellant presents in the Appeal and Reply Briefs and the Examiner presents in the Final Action and the Answer, we REVERSE for the reasons the Appellant provides. We add the following for emphasis.

Claim 1²

Independent claim 1 recites a single write assist command to (1) control a distributed capacitance, (2) to be applied to a write assist buffer circuit to provide a charging voltage to said distributed capacitance, and (3) to also be applied to a write assist grounding switch.

We refer to the Examiner’s Final Office Action and the Answer for a complete statement of the rejection of claim 1. Final Act. 4–5; Ans. 9–10.

² Independent claim 11 also recites a single write assist command. Accordingly, we limit our discussion to independent claim 1 with the understanding that our discussion applies equally to independent claim 11.

Briefly, the Examiner finds that Wu³ shows that input signals to sources SC1 and SC2 are used together to control the negative voltage generation circuit to improve the write operation (write-assist). Final Act. 4; Ans. 9–10. While the Examiner acknowledges that SC1 and SC2 are distinct signals, the Examiner contends that these signals used together represent a “single write assist command,” as claimed. Final Act. 4; Ans. 10.

Appellant argues that Wu teaches sources SC1 and SC2 are controlled by distinctly different command signals and not by a single command signal. Appeal Br. 7; *see* Wu Figure 3 (showing different input signals (command signals) for sources SC1 and SC2). Appellant contends that Wu teaches an input signal to signal source SC1 that controls (through inverter INV1 and transistors P1 and N1) either charging or discharging (through NMOS transistor N2) capacitor CAP. Appeal Br. 7 (citing Wu col. 3, l. 66–col. 4, l. 9). Appellant further contends that Wu teaches using a different input signal to signal source SC2 to control supply voltage regulator 40 which regulates a high supply voltage HV between node IN2 and SUPP and can vary dependent on power supply voltage VDD. Appeal Br. 7–8 (Wu col. 4, ll. 39–62). Thus, Appellant asserts that Wu’s input signals to signal sources SC1 and SC2 are distinctly different command signals controlling distinctly different functions and, as a result, Wu does not teach that SC1 and SC2 are a single command controlling source as the Office Action purports. Appeal Br. 8.

³ A discussion of the reference to Turner is unnecessary for disposition of this rejection. The Examiner relied on Turner for its teaching of fringe capacitances and not to address the claimed single write assist command. *See* Final Act. 4–5.

We agree with Appellant that there is reversible error in the Examiner's determination of obviousness.

The Examiner bears the initial burden of presenting a prima facie case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), *quoted with approval in KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

The Examiner's assertion that Wu's two different input signal to sources SC1 and SC2 represent a “single write assist command,” as claimed (Final Act. 4; Ans. 10), is unsupported by a preponderance of the evidence. As Appellant argues, the input signals to sources SC1 and SC2 are distinctly different command signals controlling distinctly different functions. Appeal Br. 8. While these input signals may play a role in improving the write operation, the Examiner directs us to no portion of Wu that identifies the signals themselves as write assist commands, whether taken alone or combined. Nor does the Examiner adequately explain why one skilled in the art would have inferred that Wu's distinct input signals would represent a single write assist command.

If there is any single write assist command generated by Wu, this command would be the output of Wu's negative-voltage generator 26 (designated by the Examiner as corresponding to the claimed bit line voltage unit (Final Act. 4)). *See* Wu Figure 3. In such a case, this output is at least not applied to a write assist buffer circuit to provide a charging voltage to

said distributed capacitance or to a write assist grounding switch, as required by the subject matter of claim 1.

Thus, the Examiner has not provided an adequate technical explanation with the requisite rational underpinning of why or how one skilled in the art would have arrived at the claimed single write assist command from Wu's teachings. The Examiner has not made a prima facie case of obviousness.

Accordingly, we reverse the Examiner's prior art rejection of claims 1-20 under 35 U.S.C. § 103 for the reasons the Appellant present and those we provide above.

CONCLUSION

Because the affirmed rejection does not reach all the claims, our decision is an affirmance in part.

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
2-6, 12-16	112(b)	Indefiniteness	2-6, 12-16	
1-20	103	Wu 867, Turner		1-20
Overall Outcome			2-6, 12-16	1, 7-11, 17-20

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED IN PART