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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MASANORI MIYAGI
and YOSHIKAZU KOJIMA

Appeal No. 1998-0441
Application 08/713,089[1]

ON BRIEF

Before JERRY SMITH, BARRETT, and FRAHM, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

[1] Application for patent filed September 16, 1996, entitled "Oscillation Circuit And Non-Volatile Semiconductor Memory," which is a continuation of Application 08/419,355, filed April 10, 1995, now abandoned, which claims the foreign filing priority under 35 U.S.C. § 119 of Japanese patent application 6-86942, filed April 25, 1994, and Japanese patent application 7-51173, filed March 10, 1995.

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 2, 3, 7-9, 11-14, 16, 17, and 19.

We reverse.

BACKGROUND

The invention is directed to a ring oscillator circuit which undergoes only slight changes in frequency in response to a wide variation in power supply voltage by using a constant voltage circuit.

Claim 2 is reproduced below.

> 2. A ring oscillator circuit comprising: an odd number of inverter circuits connected in a ring configuration; a constant current element connected in series between an output of a respective inverter circuit and an input of the next inverter circuit; and a constant voltage circuit comprising MOS transistors for receiving an external power source voltage and applying a constant voltage to said constant current elements.

The Examiner relies on the following prior art:

Dingwall et al. (Dingwall)	4,072,910	February 7, 1978
Matsuura	4,618,837	October 21, 1986
Sakurai	4,853,654	August 1, 1989
Motegi et al. (Motegi)	4,912,433	March 27, 1990

Anderson 5,072,197 December 10, 1991
Angiulli et al. (Angiulli) 5,365,204 November 15, 1994
(filed October 29, 1993)
Leonowich 5,434,525 July 18, 1995
(effective filing date February 25, 1993)

Claims 2, 3, 7-9, 11-14, and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Motegi.

Claim 17 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Sakurai.

Claims 2, 3, 7-9, 11-14, 16, 17, and 19 stand rejected under 35 U.S.C. § 103 as being unpatentable over Sakurai, Motegi, Dingwall, Anderson, Leonowich, Angiulli, and Matsuura.

We refer to the Final Rejection (Paper No. 10) and the Examiner's Answer (Paper No. 17) (pages referred to as "EA__") for a statement of the Examiner's position and to the Appeal Brief (Paper No. 16) (pages referred to as "Br__") and the Reply Brief (Paper No. 18) (pages referred to as "RBr__") for a statement of Appellants' arguments thereagainst.

OPINION

Summary of the invention

The Examiner considers the summary of the invention in the brief to be deficient (EA2-3). Appellants counter that the description is proper (RBr2-4).

We are capable of making our own judgment about the summary and find it to be acceptable. Moreover, it is our job to determine the correctness of the Examiner's rejection, not to rule on the propriety of the briefs.

35 U.S.C. § 102(b)

Appellants argue (Br16): "[E]ach of independent claims 2, 7, 12 and 17 clearly requires that the constant voltage source is directly connected to an external power source so as to receive an external power source voltage and output a constant voltage to a ring oscillator. The cited references to Motegi and Sakurai do not disclose any similar structure." Thus, one issue is the constant voltage source.

Claims 2, 3, 7-9, 11-14, and 16

The Examiner states that when the phase lock loop (PLL) 1 in Motegi is stable, constant voltage PV is output

from the level converting circuit 9 using external power source voltages V_{CC} and V_{SS}, as shown in Figure 5 (EA4-5).

Appellants respond that the level of PV is nonetheless dependent upon V_{CC} (RBr5):

> Thus, when V_{CC} changes, PV changes and degrades the performance of the ring oscillator. PV is described as being at a constant level only because the PLL 2 is placed in a stable state and is no longer hunting for a desired frequency. Thus, PV is "constant" because the desired frequency has been reached. However, even during stable operation PV is dependent upon V_{CC}. Motegi simply does not teach the elimination of power source voltage dependency on the operating frequency of a ring oscillator.

The Examiner does not respond to this argument. Therefore, we are without guidance on whether the Examiner's position is based on some portion of Motegi which the Examiner has not pointed out or on some unexpressed claim interpretation.

We agree with Appellants that the Examiner has failed to show that PV remains a constant voltage regardless of the power source voltage. There is no discussion in Motegi that PV remains constant over different values of the power supply voltage V_{CC} and V_{SS} for the circuit in Figure 5. Nor does it appear that the circuit in Figure 5 inherently acts as a constant voltage circuit. Accordingly, the Examiner

has failed to establish a prima facie case of anticipation. Independent claims 2, 7, and 12 all contain the limitation of a constant voltage source connected to an external power source so as to receive an external power source voltage and output a constant voltage to a ring oscillator. The anticipation rejection of claims 2, 7, and 12, and their dependent claims 3, 8, 9, 11, 13, 14, and 16 is reversed.

Appellants further argue (RBr6): "[T]he Examiner's analysis ... is based only upon analysis of the device at isolated, limited duration periods of time at which the delay time of the first variable delay circuit 3 is set equal to T/2. At these isolated time periods, PV is constant while at all other time PV varies continuously while the PLL is hunting for a desired frequency."

The Examiner does not respond to this argument.

Nevertheless, if Motegi taught that PV was a constant voltage regardless of the external power source voltage when the PLL is stable, then we do not think it would matter to meeting the claims that PV varies when the PLL is not stable. However, as noted above, the Examiner has not

demonstrated that the level comparator in Figure 5 is a constant voltage circuit.

Claim 17

Claim 17 recites first and second constant voltage circuits each comprising a pair of MOS transistors and each having an output connected to a gate electrode of a MOS transistor for maintaining the current of the inverter circuits constant. Thus, claim 17 recites two constant voltage circuits each comprising a pair of MOS transistors.

The Examiner relies on Figures 5, 9, and 10 of Sakurai.

As to Figure 5, the Examiner states (EA5-6): "In Fig. 5, current limiting transistors P11, N11... are subject to constant voltage signals from B1 that reduce the dependency of the current on power supply variation by steadying the current flowing to the capacitances of the inverters. See Fig. 8 and column 6, lines 19-25 regarding this reduction of oscillator frequency dependence on power source voltage."

As to Figure 9, the Examiner notes that the positions of the inverter transistors and the constant current transistors in Figure 5 have been switched (EA5).

As to Figure 10, the Examiner states (EA6): "See Fig. 10 and column 7, lines 10-27 for how to select a particular reduced oscillator dependency on power source voltage. It is said that current source G1 can be a diode, which to one of ordinary skill in the art was a diode-connected transistor, which were readily provided on the transistor integrated circuit. Thus the constant voltage circuit of Fig. 10 comprises a pair of MOS transistors. . . . The constant voltage circuits connected to external power source voltage Vdd-Vss."

Appellants argue that Sakurai does not disclose (1) the claimed constant voltage configuration, (2) first and second constant voltage sources each comprising a pair of MOS transistors, (3) that the input of the constant voltage circuits is an external power source voltage, or (4) that the output of the constant voltage generating circuit is applied as an input to the constant current elements (Br20).

The Examiner does not address these arguments.

Sakurai does not disclose first and second constant voltage sources each comprising a pair of MOS transistors,

as claimed. Accordingly, Sakurai does not anticipate claim 17. The rejection of claim 17 is reversed.

We further note that the Examiner has not demonstrated that the bias circuits B1, B2, and B4 in Figures 5, 9, and 10, respectively, supply a constant voltage signal regardless of the variation in voltage of the power source voltage VDD. While it is true that the frequency stability over a range of power source voltage is improved as shown in Figure 8, this does not imply that the outputs of transistors P16 and N16 have a constant voltage over a range of external voltages.

We still further note that Figure 10 shows only a single current control transistor for each inverter (e.g., N11) and so does not show third and fourth MOS transistors for maintaining the current of the inverter circuits constant as recited in claim 17.

35 U.S.C. § 103

Claims 2, 3, 7-9, 11-14, 16, and 17

The Examiner finds (EA7):

> Motegi et al and Sakurai are discussed above, and are enough for this rejection. Dingwall et al

> disclosed current regulation means. Anderson disclosed current regulation and inverter details. Angiulli et al disclosed transmission gate and inverter details. Leonowich disclosed delay and ring oscillator details. Matsuura disclosed constant voltage source, current limiting element and inverter details.

The Examiner concludes (EA7):

> It would have been obvious to one of ordinary skill in the art to have incorporated any known current control means in the delay stages of a ring oscillator as claimed. The "motivation" being design option, to stabilize the frequency of ring oscillators by making the delay stages constant using known means.

Appellants argue that the Examiner has not provided a suggestion to combine and has failed to offer any reasonable explanation as to why the combined references render obvious the rejected claims (Br25-27).

The Examiner's reasoning appears to be that it would have been obvious to substitute known current control means for the current control means in Motegi and Sakurai. This reasoning does not address the deficiencies of Motegi and Sakurai with respect to the constant voltage circuit.

Appellants address the deficiencies of Anderson, Dingwall, Angiulli, Leonowich, and Matsuura (Br23-25). The Examiner does not respond to these arguments.

The most relevant of these references is Anderson, which discloses a ring oscillator with a voltage compensation circuit that "provides a compensated supply voltage at node 44 to each of the inverters in the ring oscillator 12" (col. 2, lines 51-52). However, Appellants argue that "Anderson fails to disclose or suggest the use of constant current elements disposed between the series-connected inverter circuits" (Br24). The Examiner has failed to advance any reasoning why one of ordinary skill in the art would have sought to apply the voltage compensation circuit of Anderson into a ring oscillator circuit having constant current elements and, thus, has failed to establish a prima facie case of obviousness. The other references are less relevant than Anderson. Therefore, the rejection of claims 2, 3, 7-9, 11-14, 16, and 17 is reversed.

Claim 19

Claim 19 is directed to a non-volatile memory device including "the oscillator circuit according to claim 7." We construe claim 19 as a dependent claim for fee calculation purposes although it would be equally possible to interpret it as an independent claim which incorporates by reference

the limitations of claim 7. See Ex parte Moelands, 3 USPQ2d 1474 (Bd. Pat. App. & Int. 1987); Ex parte Porter, 25 USPQ2d 1144, 1147 (Bd. Pat. App. & Int. 1992) ("While claim 6 could be construed as an independent claim, drafted in a short-hand format to avoid rewriting the particulars of the nozzle recited in claim 7, for fee calculation purposes the Office initially treats all claims that refer to another claim as a dependent claim. M.P.E.P. § 608.01(n) under the heading TREATMENT OF IMPROPER DEPENDENT CLAIMS.").

The Examiner states that "[i]t was said in the specification background on pages 1-2, that the prior art included ring oscillators used this way [i.e., in a non-volatile memory device], which is therefore apparently the prior art relied on" (EA7).

It is clear that the Examiner belatedly relies on the admitted prior art in the specification for the first time in the Examiner's Answer, although the Examiner's Answer states that it does not contain any new ground of rejection. Nevertheless, the admitted prior art does not disclose a constant voltage supply connected to constant current elements connected between series-connected inverter

circuits. As noted in the analysis of claims 2, 7, 12, and 17, the Examiner has merely cited seven references with no particular reasoning of how they should be combined. Since the Examiner has failed to establish a prima facie case of obviousness as to claim 7, we conclude that the Examiner has likewise failed to establish a prima facie case of obviousness with respect to claim 19. The rejection of claim 19 is reversed.

CONCLUSION

The rejections of claims 2, 3, 7-9, 11-14, 16, 17, and 19 are reversed.

REVERSED

JERRY SMITH)
Administrative Patent Judge)
)
)
)
) BOARD OF PATENT
LEE E. BARRETT) APPEALS
Administrative Patent Judge) AND
) INTERFERENCES

)
)
)
ERIC S. FRAHM)
Administrative Patent Judge)

ADAMS & WILKS
50 Broadway
31st Floor
New York, NY 10004