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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RICHARD DAVID PEARSON and
LUIGI LANFRANCHI¹

Appeal 2015-002726
Application 13/289,945
Technology Center 2800

Before CATHERINE Q. TIMM, WESLEY B. DERRICK, and
LILAN REN, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL²

STATEMENT OF CASE

Pursuant to 35 U.S.C. § 134(a), Appellants appeal from the Examiner's decision to reject claims 1–18. We have jurisdiction under 35 U.S.C. § 6(b).

¹ Appellants identify the real party in interest as RADIODETECTION LTD. Br. 3.

² In our opinion below, we reference the Specification filed November 4, 2011 (Spec.), Final Office Action mailed January 31, 2014 (Final), the Appeal Brief filed July 3, 2014 (Br.), and the Examiner's Answer mailed October 24, 2014 (Ans.).

We AFFIRM.

The claims are directed to a signal generator including two sets of oscillators, filters, and terminals. Claim 1 is illustrative:

1. A signal generator for coupling to a concealed conductor, comprising

a first oscillator configured to generate a first waveform having a first frequency;

a first terminal coupled to the first oscillator through a first filter configured to pass signals of the first frequency;

a second oscillator configured to generate a second waveform having a second frequency; and

a second terminal coupled to the second oscillator through a second filter configured to pass signals of the second frequency.

Br. 23 (Claims Appendix).

The Examiner maintains the following rejections:

- A. The rejection of claims 1–6, 11–13, and 15 under 35 U.S.C. § 103(a) as obvious over Stratakos³ in view of Hiraki;⁴
- B. The rejection of claims 7–10 under 35 U.S.C. § 103(a) over Stratakos in view of Hiraki, and further in view of Odagiri;⁵ and
- C. The rejection of claims 14 and 16–18 under 35 U.S.C. § 103(a) over Stratakos in view of Hiraki, and further in view of Pearson.⁶

³ Stratakos et al., US 2012/0044014 A1, published Feb. 23, 2012.

⁴ Hiraki et al., US 2003/0034823 A1, published Feb. 20, 2003.

⁵ Odagiri, US 8,115,563 B2, issued Feb. 14, 2012.

⁶ Pearson et al., US 7,342,537 B2, issued Mar. 11, 2008.

OPINION

Rejection A

For the rejection of claims 1–6, 11–13, and 15 under 35 U.S.C. § 103(a) as obvious over Stratakos in view of Hiraki, Appellants present separate arguments for claims 1, 2, 3, 4, 5, and 6. Br. 7–18. Thus, we select those claims as representative for deciding the issues on appeal. Claims 11–13, and 15 stand or fall with claim 1.

Claim 1

The Examiner finds that Stratakos discloses a signal generator as shown in Figure 27 that includes a first oscillator configured to generate a first waveform having a first frequency (pointing to element 2702(1)) and a second oscillator configured to generate a second waveform having a second frequency (pointing to element 2702(2)). Final 2. The Examiner further finds that Stratakos suggests the use of filters, but applies Hiraki to explicitly show the details of such filters. Final 3; Ans. 16. The Examiner further finds that the combination of Stratakos and Hiraki teach a first terminal coupled to the first oscillator through a first filter configured to pass signals of the first frequency, and a second terminal coupled to the second oscillator through a second filter configured to pass signals of the second frequency as required by claim 1. Final 3.

Appellants parse the claim apart and direct arguments to various portions of the parsed claim. Considering the arguments as they relate to the claim and rejection, we articulate the issue as: Have Appellants identified a reversible error in any of the following: (1) the Examiner’s finding that Stratakos discloses oscillators having the configuration required by claim 1; (2) the Examiner’s determination that the preamble language “signal

generator for coupling to a concealed conductor” fails to structurally distinguish the apparatus of the claim from that of the prior art; and (3) the Examiner’s finding that together Stratakos and Hiraki would have suggested to one of ordinary skill in the art including filters in the apparatus of Stratakos so that a first terminal is coupled to the first oscillator through a first filter and a second terminal is coupled to the second oscillator through a second filter?

Issue (1): Oscillators

Appellants contend that Stratakos does not disclose that elements 2702(1) and 2702(2) are oscillators, and then further contend that Stratakos and Hiraki fail to teach “*a signal generator to ‘generate a first waveform having a first frequency’ and ‘generate a second waveform having a second frequency’*” as purportedly recited by claim 1. Br. 7–9 (emphasis added).

Appellants’ arguments do not identify a reversible error in the Examiner’s findings with regard to the oscillator limitations of the claim.

First, Appellants’ arguments misconstrue the requirements of the claim. Claim 1 does not require the “signal generator” generate the waveforms; rather, the claim requires *oscillators* be “configured” to perform the generating function.

Second, considering that the claim is directed to an apparatus and further considering that the structural elements at issue are first and second oscillators configured to generate waveforms having frequencies, the issue is whether Stratakos’ switching circuits 2702 have the structure of the oscillators required by the claim. *See Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1468 (Fed. Cir. 1990) (“apparatus claims cover what a device *is*, not what a device *does*.”); *In re Nuijten*, 500 F.3d 1346,

1355 (Fed. Cir. 2007) (“[t]he Supreme Court has defined the term ‘machine’ as ‘a concrete thing, consisting of parts, or of certain devices and combination of devices.’” (quoting *Burr v. Duryee*, 68 U.S. (1 Wall.) 531, 570 (1863))).

To answer the question, we first look to the Specification to determine what Appellants mean by “oscillator” and what structures are encompassed.

As pointed out by the Examiner (Ans. 12), Appellants’ Specification describes an embodiment with a first oscillator that “generates an AC signal having a frequency of 33 kHz” and a second oscillator that “generates a signal having a second frequency,” for example, a frequency of 66 kHz. Spec. ¶ 35. This portion of the Specification states that Figure 1 illustrates oscillators 102 and 104. Figure 1 shows oscillators 102 and 104 as black boxes without any particular structure. It is not known from this disclosure whether an oscillator configured to generate a first waveform having a first frequency has a different structure than a second oscillator configured to generate a second waveform having a second frequency.

Appellants also describe schematic diagrams of embodiments (Fig. 2, 3A) that use controllers (e.g., 202 in Fig. 2) to generate a first waveform having a first frequency and a second waveform having a second frequency that feeds the waveform through amplifiers (204 in Fig. 2) containing switching devices in half-bridge formation (e.g., 218, 220 in Fig. 2). Spec. ¶¶ 40, 44. In an embodiment that is an alternative to the embodiment of Figure 2, the Specification discloses using a pair of crystal oscillator circuits running independently of one another as “the oscillators controlling the half-

bridges.” Spec. ¶ 43.⁷ The Specification does not provide details of the crystal oscillator circuits.

Given the lack of guidance in the Specification, we determine that any circuit structure that generates oscillating electric currents or voltages is an “oscillator.”

Stratakos is directed to an apparatus for maximizing the amount of power extracted from an electric power source with a non-linear power curve, such as a photovoltaic device, a battery, or a fuel cell. Stratakos ¶ 96. In one embodiment, the electric power system includes multiple switching circuits 2702 as shown in Figure 27. Stratakos ¶ 251. Figure 27 shows three such switching circuits 2702(1), 2702(2), and 2702(3).

The switching circuits 2702 are each an embodiment of switching circuit 504 shown in Figure 5, which are in turn an embodiment of the switching circuits 404 of Figure 4. Stratakos ¶¶ 117, 251. The switching devices within the switching circuits switch at a frequency of, for example 20 kHz, or at higher frequencies of from about 500 kHz to 800 kHz. Stratakos ¶¶ 101–102. The frequencies may be fixed, varied, or displaced in phase, and the duty cycle controlled. Stratakos ¶¶ 103–104. Thus, the switching circuits 2702 of Stratakos are “oscillators” within the meaning of claim 1.

⁷ The main embodiment of Figure 2 uses a controller 202 to generate waveforms at a first frequency of 33 kHz and a second frequency of 66 kHz and does not specifically state that two oscillators generate the two waveforms. Thus, it is not clear that the embodiment of Figure 2 is encompassed by claim 1. Similarly, it is not clear that the embodiment of Figure 3A is encompassed by claim 1.

A preponderance of the evidence supports the Examiner’s finding that switching circuits 2702(1) and 2702(2) are first and second oscillators configured as required by claim 1. Each switching circuit generates a waveform having a frequency and the frequency may vary.

Issue (2): The preamble

Appellants contend that Stratakos does not teach a “signal generator for coupling to a concealed conductor” as recited by claim 1. Br. 10. As pointed out by the Examiner, this language is found in the preamble of claim 1. Ans. 15. “Whether to treat a preamble term as a claim limitation is ‘determined on the facts of each case in light of the claim as a whole and the invention described in the patent.’” *Am. Med. Sys., Inc. v. Biolitec, Inc.*, 618 F.3d 1354, 1358 (Fed. Cir. 2010) (quoting *Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 831 (Fed. Cir. 2003)). Generally, the preamble does not limit the claim, although it may be limiting if it recites essential structure or steps or is otherwise necessary to give life and meaning to the claim. *Id.* But “the preamble has no separate limiting effect if, for example, ‘the preamble merely gives a descriptive name to the set of limitations in the body of the claim that completely set forth the invention.’” *Id.* (quoting *IMS Tech., Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1434–35 (Fed. Cir. 2000)).

As pointed out by the Examiner, “coupling to a concealed conductor” is merely the intended use of the signal generator. Appellants do not provide any persuasive evidence that the intended use provides any additional structure to the signal generator, nor do Appellants provide any evidence that the moniker “signal generator” adds any structure to the claim that is not

already recited in the body of the claim. Thus, Appellants' argument fails to identify a reversible error in the Examiner's rejection.

Issue (3): Terminals coupled to oscillators through filters

As we stated above, the Examiner finds that the combination of Stratakos and Hiraki would have suggested the terminal and filter arrangement of the claims. Appellants urge that neither reference teaches the terminals, filters, or the arrangements required by the claim, and one of ordinary skill in the art would not have combined the teachings of Stratakos and Hiraki "to render obvious 'a signal generator for coupling to a concealed conductor' as recited in claim 1." Br. 10–13.

First, the combination need not teach the intended use in order to teach or suggest an apparatus having all of the structures required by the claim.

Second, the Examiner finds that Stratakos suggests the use of a filter. Ans. 16, citing Stratakos ¶ 102. Given that teaching, we are not persuaded that there is no suggestion within the prior art for using a filter in the location required by claim 1.

Claims 2–4

Claims 2–4 each depends from claim 1 and further limits either the second frequency or the first waveform recited in the functional portion of the "configured to" clauses of claim 1. For instance, claim 2 requires the second frequency be a harmonic of the first frequency. Thus, the second oscillator of claim 1 must be "configured to generate a second waveform having a second frequency" that "is a harmonic of the first frequency." Claim 3 requires the second frequency be "twice the first frequency." Claim

4 requires the first waveform be “selected to suppress a third harmonic frequency of the first frequency.”

We agree with the Examiner that Stratakos suggests using oscillators meeting the requirements of claims 2–4. Final 3–4; Ans. 20–24. Stratakos suggests using oscillators that can generate various waveforms at various frequencies. Stratakos ¶¶ 101–103. Appellants have not persuaded us that the claimed oscillators are structurally distinguishable from the switching circuits of Stratakos.

Claim 5

Claim 5 depends from claim 1 and further requires a power supply that provides a supply voltage and a ground voltage for the first and second oscillators.

The Examiner finds 2706 and 2704 and Hiraki Vcc and Vss suggest the necessary power supply. Final 4. Stratakos teaches each switching circuit 2702 includes input terminals 2704, 2706 for connecting to a respective power source such as a photovoltaic device. Stratakos ¶ 252. Thus, Stratakos suggests connecting to a power supply. The Examiner explains that “[it] is physically impossible to operate the first and second oscillators without a power supply that provides a supply voltage and a ground voltage.” Ans. 24. Appellants do not respond. No reply brief was filed.

A preponderance of the evidence supports the Examiner’s findings.

Claim 6

Claim 6 depends from claim 5 and requires “the first and/or second oscillator [further] comprises a current sensor and the power supply is

configured to reduce the supply voltage if a current detected by the current sensor exceeds a predetermined value.”

Appellants contend that “[t]he Examiner makes a general assertion that Stratakos teaches the features of claim 6, but fail [sic, fails] to provide any support for a current sensor.” Br. 17. But, as pointed out by the Examiner, Stratakos teaches that the system helps to maximize the “amount of electric power extracted from an electric power source with a non-linear power curve, such as a photovoltaic device” (Stratakos ¶ 96), but which does not “exceed the predetermined value that the device is capable of extracting.” Final 4–5. Stratakos supports this finding at paragraph 96 and also at paragraph 110, which states that the switching circuits “may include current measurement circuitry to achieve over-current protection.” Stratakos ¶ 110. Moreover, Appellants do not respond to the Examiner’s finding. No reply brief was filed.

A preponderance of the evidence supports the finding of the Examiner. Appellants have not identified a reversible error in the Examiner’s rejection of claim 6.

Rejection B

In addressing the rejection of claims 7–10 under 35 U.S.C. § 103(a) over Stratakos in view of Hiraki, and further in view of Odagiri, Appellants do not argue any claim apart from the others. We select claim 7 as representative for resolving the issue on appeal.

Claim 7 requires that the signal generator of claim 1 further comprise “a first amplifier configured to amplify the first waveform and a second amplifier configured to amplify the second waveform.”

Appellants' Specification discloses amplifiers (e.g., 204, 210 in Fig. 2), for instance, as formed from a driver 216 that drives two switching devices 218 and 220 arranged in a half-bridge formation. Spec. ¶ 40.

The Examiner acknowledges that neither Stratakos nor Hiraki teach the required amplifiers. The Examiner finds that Odagiri, in Figure 4, teaches a first amplifier configured to amplify the first waveform (3A) and a second amplifier configured to amplify the second waveform (3B).

According to the Examiner, “[i]t would have been obvious to one of ordinary skill in the art to use the teachings of Odagiri to further drive the circuit taught in Stratakos et al. and Hiraki et al., as a whole, for the purpose of ‘making the power consumption smaller’. (Odagiri, Col. 2, line 45).”

Final 6.

Odagiri is directed to a voltage-feedback class-D amplifier circuit for improving the frequency characteristic of a circuit part which performs pulse width modulation by comparing an input signal with a triangular wave.

Odagiri, col. 1, ll. 15–20. According to Odagiri,

Generally, a voltage-feedback class-D amplifier circuit is used as a circuit which drives an actuator or a motor. Using the voltage-feedback class-D amplifier circuit has a purpose of making the power consumption smaller, compared with a BTL (Bridged Transformer-Less) amplifier of an analog drive.

Odagiri, col. 2, ll. 42–47.

Appellants state that Odagiri is directed to a positive-side command value generation circuit 3A and contend that:

There is no motivation to utilize a positive-side command value generation circuit 3A which utilizes pulse width modulation in conjunction with DC power supply of either

Stratakos or Hiraki. It would be unsatisfactory for the intended purpose of Stratakos or Hiraki of supplying a DC power.

Br. 19.

This argument is not persuasive for the reasons set forth by the Examiner in the Answer. Ans. 27. The Examiner's rejection is not based on using positive-side command value generation circuit 3A of Odagiri, specifically, but on the concept of using driving circuits, such as the ones taught by Odagiri, to drive circuits within the Stratakos power extraction apparatus.

Rejection C

In arguing against the rejection of claims 14 and 16–18 under 35 U.S.C. § 103(a) over Stratakos in view of Hiraki, and further in view of Pearson, Appellants do not argue any claim apart from the others. Instead, Appellants argue that it would not have been obvious to combine the teachings of Stratakos, Hiraki, and Pearson. Br. 20–21. According to Appellants, using the DC power source of Stratakos and/or Hiraki would render Pearson inoperative because Pearson requires the use of an alternating current. Br. 21.

Appellants' argument is not persuasive because Pearson uses batteries, a DC power source, to supply power. Pearson, col. 5, ll. 57–59.

CONCLUSION

We sustain the Examiner's rejections.

DECISION

The Examiner's decision is affirmed.

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TIME PERIOD FOR RESPONSE

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

AFFIRMED