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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/187,313	08/06/2008	Gonzalo Fernandez Llona	SGS0.02300US	2782

27896 7590 10/28/2016
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ART UNIT	PAPER NUMBER
3742	

NOTIFICATION DATE	DELIVERY MODE
10/28/2016	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte GONZALO FERNANDEZ LLONA

Appeal 2014-009565
Application 12/187,313
Technology Center 3700

Before JENNIFER D. BAHR, LINDA E. HORNER, and BRANDON J. WARNER, *Administrative Patent Judges*.

BAHR, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Gonzalo Fernandez Llona (Appellant) appeals under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1–5, 8, and 9 under 35 U.S.C. § 103(a) as unpatentable over Banzato (US 6,841,761 B1, iss. Jan. 11, 2005), Tieden (US 4,051,394, iss. Sept. 27, 1977), and Yurick (US 7,508,240 B1, iss. Mar. 24, 2009); and rejecting claims 6 and 7 under 35 U.S.C. § 103(a) as unpatentable over Banzato, Tieden, Yurick, and Hu (US 5,640,113, iss. June 17, 1997). We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

THE CLAIMED SUBJECT MATTER

Claim 1, reproduced below, is illustrative of the claimed subject matter.

> 1. A system for controlling at least one heat source connected to an alternating voltage power supply, the system comprising:
>
> a user interface that permits a user to select an output power of the heat source,
>
> a rectifier that produces at least one square and periodic rectified signal corresponding to at least one phase of the alternating voltage produced by the power supply,
>
> a controller that is configured to receive the rectified signal and which determines the work ratio of said rectified signal, the work ratio being the ratio between the duration of a positive pulse and the duration of a void interval of the rectified signal, and
>
> a modifier disposed in series between the power supply and the rectifier that acts upon the at least one phase of the alternating voltage in a manner that causes the work ratio of the rectified signal produced by the rectifier to be dependent on a nominal voltage of the alternating voltage,
>
> the controller being capable of controlling the output power of the heat source in accordance with the power selected by the user, and modifying the work cycle of a power signal linked to the heat source in accordance with the determined work ratio in order to compensate possible differences in the nominal voltage between different power supplies.

DISCUSSION

Rejection I

Independent claim 1 recites, in relevant part, "a controller that is configured to receive the rectified signal and which determines the work ratio of said rectified signal, the work ratio being the ratio between the duration of a positive pulse and the duration of a void interval of the rectified signal." Appeal Br. 50 (Claims App.). Independent claim 9

similarly recites, in relevant part, "determining the work ratio of the rectified signal, the work ratio being the ratio between the duration of a positive pulse and the duration of a void interval of the rectified signal." *Id.* at 52 (Claims App.).

The Examiner acknowledges that "Banzato does not teach expressly a work ratio of a rectified signal, the work ratio being the ratio between the duration of a positive pulse and the duration of a void interval of the rectified signal." Ans. 3. However, the Examiner finds that Tieden discloses "a controller that is configured to receive the rectified signal and which determines the work ratio of said rectified signal." *Id.* (citing Tieden, col. 4, ll. 3–32). The Examiner additionally states: "[s]ee also figures 1–3 and column 1 line 55–col[umn] 2 line 30 of Yurick in this regard as well." *Id.* at 5. The Examiner determines that "[i]t would have been obvious at the time of the invention to modify the counting technique of Banzato with an alternate technique of duration or timing taught by Tieden or Yurick for simplification, compactness and cost effectiveness." *Id.* at 7.

Appellant argues that each of Tieden and Yurick fails to disclose a controller that determines a work ratio of a rectified signal, the work ratio being the ratio between the duration of a positive pulse and the duration of a void interval of the rectified signal. *See* Appeal Br. 17–20; Reply Br. 15–16. For the reasons that follow, Appellant's argument is persuasive of error in the rejection.

Tieden discloses "an AC relay control circuit that senses the impending occurrence of the zero crossing point of an AC voltage and generates a trigger signal adapted to cause relay contact closure at the zero crossing point." Tieden, col. 1, l. 67 – col. 2, l. 3. The control circuit uses a

combination of Zener diodes, resistors, light emitting diodes, and photo transistors to control relay contact closure at the zero crossing point for the purpose of eliminating arcing. *See id.*, col. 2, ll. 4–17, 29–35. Namely, as the AC wave form approaches a zero crossing point and the voltage drops below the breakdown voltage level of a Zener diode, the control circuit generates a trigger signal that controls the closure of relay contacts. *See id.*, col. 2, ll. 17–27; col. 4, ll. 23–34. The control circuit is designed to account for a known "delay time between the time a trigger signal is applied to the coil of the relay and the closure of the relay contacts." *Id.*, col. 4, ll. 3–7. Specifically, the choice of a particular Zener diode breakdown voltage level "is based on the invention's requirement that the *time delay between the onset of the trigger signal and the zero crossing point* must be equal to the time delay between the application of a trigger signal to the related relay and closure of the relay's contacts." *Id.*, col. 4, ll. 11–16 (emphasis added).

According to the Examiner:

> Tieden uses trigger voltage as a work ratio. *The trigger voltage is a unit of time just like the work ratio is a measure of time*. Both times are measured from the start of rectification to the zero crossing of the positive pulse. Furthermore Tieden does teach a work cycle in the form of a pulse output of the relay. *Tieden's trigger voltage determines the output pulses of the relay; therefore Tieden discloses a work ratio* that modifies the work cycle of the electronic system.

Ans. 5 (emphasis added) (boldface omitted). The Examiner further explains that Tieden's Figure 2 shows "the duration (time-x axis) of the positive pulse changes in relation to the void interval of the rectified signal produced by the rectifier and is dependent upon the a [sic] nominal voltage of the alternating voltage." *Id.* at 16.

Appellant responds that "[a]s those of skill in the art of electronics and physics readily know, voltage is a measure of the difference in electric potential between two points in space" and "[v]oltage is a representation of the electric potential energy per unit charge." Reply Br. 20. In this regard, we agree with Appellant that Tieden's trigger voltage "is not a unit of time nor is it a work ratio." *Id.* (boldface omitted). To the extent that the time delay disclosed by Tieden represents a duration, such duration pertains to the anticipated delay between the trigger signal and the corresponding closure of the relay contacts. The delay time is used as a design parameter for selecting appropriate Zener diode values for a given AC input voltage to ensure that the relay closes at or near the zero crossing point of the AC waveform. *See* Tieden, col. 3, l. 64 – col. 4, l. 16. Thus, we are not convinced that Tieden's trigger voltage signal represents a work ratio (i.e., the ratio between the duration of a positive pulse and the duration of a void interval of the rectified signal).

Moreover, we find nothing in the portions of Tieden cited by the Examiner (i.e., column 3, line 62 – column 4, line 36 and Figure 2), or elsewhere in Tieden, supporting the Examiner's finding that Tieden discloses *determining* a work ratio (Ans. 3). To the extent that the Examiner's explanation suggests that a relationship between input voltage, positive pulse duration, and void duration *could be* discerned from Figure 2 of Tieden and used to determine a work ratio (*see* Ans. 5, 11 (including annotated reproduction of Figure 2 of Tieden)), nothing in Tieden discloses or suggests *determining* the duration of a positive pulse or the duration of a void interval, much less *determining* the ratio of these durations, as called for in the claims.

The Examiner's citation to Yurick (*see id.* at 5 (citing Yurick, Figs. 1–3; col. 1, l. 55 – col. 2, l. 30)) is also unavailing because this reference suffers from the same deficiency as Tieden. Yurick discloses a diode-based, zero-crossing detector for AC power mains. *See* Yurick, col. 1, ll. 56–58. The detector rectifies an AC input signal to produce a square wave output, and uses the leading and trailing edges of the square wave to indicate zero crossing points of the AC mains. *See id.*, col. 1, l. 58 – col. 2, l. 3. The detector uses a "constant current through the diode **122A** [that] minimizes the effect of the time difference between the true AC mains zero crossings and the time of the turn-off/turn-on voltages of the diode **122A**." *Id.*, col. 2, ll. 13–16. However, the Examiner does not specifically point to, nor do we discern, any disclosure in Yurick with regard to a work ratio between the duration of a positive pulse and the duration of a void interval of the rectified signal, much less *determining* a work ratio of the rectified signal, as called for in Appellant's claims.

For the above reasons, the Examiner's rejection lacks the requisite findings and reasoning to establish by a preponderance of the evidence that the proposed combination of Banzato, Tieden, and Yurick renders obvious the subject matter of independent claims 1 and 9. Accordingly, we do not sustain the rejection of independent claims 1 and 9, or of claims 2–5 and 8 depending from claim 1, under 35 U.S.C. § 103(a) as unpatentable over Banzato, Tieden, and Yurick.

Rejection II

The rejection of claims 6 and 7, which depend from claim 1, incorporates the aforementioned unsupported findings regarding Tieden or

Yurick teaching determining a work ratio as called for in claim 1. *See* Ans. 9 (referencing "the Banzato-Tieden-Yurick combination"). The Examiner does not articulate any findings or reasoning, or rely on any teachings in Hu, that would remedy the deficiency in the Examiner's combination of Banzato, Tieden, and Yurick. *See id.* at 9–10 (relying on Hu for its teachings with regard to using a capacitor in an electrical appliance control circuit). Accordingly, we do not sustain the rejection of claims 6 and 7 under 35 U.S.C. § 103(a) as unpatentable over Banzato, Tieden, Yurick, and Hu.

DECISION

The Examiner's decision rejecting claims 1–9 is reversed.

REVERSED