Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte ABDOLREZA LANGARI and SEYED HASHEMI

Appeal No. 2002-1919
Application No. 09/266,376

ON BRIEF

Before THOMAS, GROSS, and BARRY, *Administrative Patent Judges*.
BARRY, *Administrative Patent Judge*.

DECISION ON APPEAL

A patent examiner rejected claims 1-11 and 15. The appellants appeal therefrom under 35 U.S.C. § 134(a). We reverse.

BACKGROUND

The invention at issue on appeal concerns thermal management of a semiconductor device operating in a pulsed power mode, which the appellants also term a "time sharing mode or a pulse mode." (Spec. at 3.) In such a mode, a digital communication device having data to transmit will turn on, broadcast the data, and then turn off. (*Id.*)

According to the appellants, however, such cycling of power can lead to continual thermal stress as the device is turned on, dissipates considerable power, and is then turned off. (Spec. at 3.) In the confined space of a personal communication device such as a portable telephone, they add, temperature swings due to the rapid cycling of power can lead to significant, continuous mechanical stress on the telephone's semiconductor devices, circuit connections, wire bonds, and other mechanical connections. (*Id.*)

Accordingly, the object of the invention is to reduce peak temperatures and thermal excursions of a semiconductor device operating in a pulsed power mode. Specifically, a Phase Change Material ("PCM") is thermally coupled to the semiconductor device. A PCM is a material that absorbs heat and stays at a constant temperature during its phase change from solid to liquid. For the invention, a PCM having a melting point just below the temperature the device would otherwise achieve is used. When the device approaches the maximum temperature, the PCM melts, absorbing heat released from the device and lowering the device's peak temperature. When the device's power is pulsed off, the PCM solidifies, releasing the absorbed heat. This release of heat keeps the device from cooling off as much as it would absent the PCM. By lowering the peak temperature the device achieves, and increasing the temperature of the device when it is powered off, the appellants assert that

temperature excursions of the device are reduced, which reduces thermal stress on the device. (*Id.* at 27.)

A further understanding of the invention can be achieved by reading the following claim.

> 1. An apparatus for minimizing thermal excursions, the apparatus comprising:
>
> a semiconductor device, operating at temperature equilibrium and in a pulse mode, the pulse mode comprising an on period and an off period, for which thermal excursions are to be minimized; and
>
> a PCM material, thermally coupled to the semiconductor device, whereby the PCM material absorbs heat, from the semiconductor device, during the on period, by changing from a solid state to a liquid state and whereby the PCM material supplies heat, to the semiconductor device, during the off period by changing from a liquid state to a solid state.

Claims 1-10 stand rejected under 35 U.S.C. § 112. Claims 1-11 and 15 stand rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,007,478 ("Sengupta").

OPINION

Our opinion addresses the following rejections:

- rejection of claims 1-10 under § 112
- rejection of claim 1-11 and 15 under § 103(a).

Rejection of Claims 1-10 under § 112

Rather than reiterate the positions of the examiner or the appellants *in toto*, we address the main point of contention therebetween. The examiner asserts, "[r]egarding claim 1, the originally filed specification fails to disclose a semiconductor device operating at temperature equilibrium and in a pulse mode. The remaining claims are included due to dependency." (Examiner's Answer at 3.) The appellants argue, "the specification . . . on page 19 explicitly discloses a pulse power device operating at temperature equilibrium." (Appeal Br. at 4.)

"Analysis begins with a key legal question -- *what* is the invention *claimed*?" *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1567, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987). Here, independent claim 1 specifies in pertinent part the following limitations: "a semiconductor device, operating at temperature equilibrium and in a pulse mode, the pulse mode comprising an on period and an off period. . . ."

Having ascertained what subject matter is being claimed, we turn to the rejection. Although the examiner states that the claims "are rejected under 35 U.S.C. 112, second paragraph, as being indefinite," (Examiner's Answer at 3), his assertion that "the originally filed specification fails to disclose a semiconductor device operating at temperature equilibrium and in a pulse mode," (*id.*), is worded in terms of a rejection under 35 U.S.C. § 112, first paragraph, as lacking an adequate written description. To address this inconsistency, "[w]e state at the outset exactly what is meant by the

requirement . . . of the second paragraph of § 112 which was the stated basis for the rejection, given the shorthand name 'indefiniteness.'" *In re Conley*, 490 F.2d 972, 975, 180 USPQ 454, 456 (CCPA 1974). "It is essentially a requirement for *precision and definiteness* of claim language so that the claims make clear what subject matter they encompass and thus what the patent precludes others from doing." *In re Spiller*, 500 F.2d 1170, 1180, 182 USPQ 614, 621 (CCPA 1974) (citing *Conley*, 490 F.2d at 975, 180 USPQ at 456). "The second paragraph of §112 pertains *only* to claims." *In re Ehrreich*, 590 F.2d 902, 906, 200 USPQ 504, 508 (CCPA 1979) (citing *In re Borkowski*, 422 F.2d 904, 909, 164 USPQ 642, 645 (1970)). "Agreement, or lack thereof, between the claims and the specification is properly considered only with respect to the first paragraph of §112; it is irrelevant to compliance with the second paragraph of that section." *Id.*, 164 USPQ at 508.

Here, the alleged failure of the appellants' originally filed specification to disclose a semiconductor device operating at temperature equilibrium and in a pulse mode cannot serve as a basis for an indefiniteness rejection. We find no indefiniteness in the use of the above-quoted limitations in the rejected claims. Instead, we agree with the appellants that the examiner's "recitation of 'second paragraph' and the language immediately following is a typographical error and should have read 'first paragraph.'" (Appeal Br. at 3.) Accordingly, we treat the rejection as one under 35 U.S.C. § 112, ¶ 1, for lacking an adequate written description.

"'Although [the applicant] does not have to describe exactly the subject matter claimed, . . . the description must clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed.'" *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563, 19 USPQ2d 1111, 1116 (Fed. Cir. 1991) (quoting *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989)). "[T]he test for sufficiency of support . . . is whether the disclosure of the application relied upon 'reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter.'" *Ralston Purina Co. v. Far-Mar-Co., Inc.,* 772 F.2d 1570, 1575, 227 USPQ 177, 179 (Fed. Cir. 1985) (quoting *In re Kaslow*, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983)). "Application sufficiency under §112, first paragraph, must be judged as of the filing date [of the application]." *Vas-Cath*, 935 F.2d at 1566, 19 USPQ2d at 1119 (citing *United States Steel Corp. v. Phillips Petroleum Co.*, 865 F.2d 1247, 1251, 9 USPQ2d 1461, 1464 (Fed. Cir. 1989)).

Here, the appellants' original specification, which includes the original claims, discloses the aforementioned limitations. Specifically, Figure 12 of the specification generally "depicts the method by which PCM, thermally coupled to a device, can buffer and minimize operational temperature excursions during *pule power operation*." (Spec. at 17 (emphasis added).) In explaining the depicted method, more specifically, the specification discloses that "[t]he *pulse power* device would experience temperature variations during the time the device were attaining *equilibrium temperature*. . . ." (*Id.*

at 19. (emphases added).) Therefore, we reverse the rejection of claims 1-10 as lacking an adequate written description.

Rejection of Claims 1-11 and 15 under § 103(a)

Admitting that Sengupta fails to disclose *inter alia* "operating the electronic device in a pulse mode manner," (Examiner's Answer at 4), the examiner alleges that "a semiconductor operating in a pulse mode manner . . . [is] considered to be [an] obvious design expedient[s] in view of the electronic device. . . which do [es] not solve any stated problem or produce any new and/or unexpected result." (*Id.*) Noting that "[i]n a pulsed power device, power is sequentially turned on and off while the device is operating, thereby reducing the total amount of power dissipated by the device but increasing the temperature variation for the device during operation," (Appeal Br. at 6), the appellants argue, "operating a device in a pulsed mode would run contrary to operating a device at temperature equilibrium." (*Id.*)

"The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992) (citing *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)). "[T]he factual inquiry whether to combine references must be thorough and searching." *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351-52, 60

USPQ2d 1001, 1008 (Fed. Cir. 2001). The inquiry cannot "be resolved on subjective belief and unknown authority," *In re Lee*, 277 F.3d 1338, 1343-44, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002); "[i]t must be based on objective evidence of record." *Id.* at 1343, 61 USPQ2d at 1434. Although these requirements are couched in terms of combining references, we hold the same requirements apply to modifying such a reference.

Here, the examiner fails to show objective evidence of the desirability of operating Sengupta's "electronic component(s)," col. 3, l. 15, in a pulsed mode comprising an on period and an off period. His broad conclusion that such a modification would have been an "obvious design expedient[]," (Examiner's Answer at 4), is "not 'evidence.'" *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (citing *McElmurry v. Arkansas Power & Light Co.*, 995 F.2d 1576, 1578, 27 USPQ2d 1129, 1131 (Fed. Cir. 1993); *In re Sichert*, 566 F.2d 1154, 1164, 196 USPQ 209, 217 (CCPA 1977)).

In addition, contrary to the examiner's premise that a semiconductor operating in a pulsed mode "do[es] not solve any stated problem," (Examiner's Answer at 4), the appellants' specification discloses advantages to operating a device in "a time sharing mode or pulse mode." (Spec. at 3.) Specifically, such a mode "allows several communications systems to share the same frequency without interfering with each other." (*Id.*) Furthermore, "[a] time sharing system can also lower over all power

dissipation of a communication system, because it operates for only a fraction of the time that a continuous system operates." (*Id.*) Therefore, we reverse the obviousness rejection of claims 1-11 and 15.

CONCLUSION

In summary, the rejection of claims 1-10 under § 112, ¶1, and the rejection of claims 1-11 and 15 under § 103(a) are reversed.

REVERSED

JAMES D. THOMAS Administrative Patent Judge	)
ANITA PELLMAN GROSS Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
LANCE LEONARD BARRY Administrative Patent Judge	)

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