

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte DAMON W. BRODER and ORIN M. OZIAS

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Appeal No. 2002-2304  
Application No. 09/419,157

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ON BRIEF

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Before JERRY SMITH, GROSS, and LEVY, Administrative Patent Judges.  
LEVY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-82<sup>1</sup>, which are all of the claims pending in this application.

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<sup>1</sup> The examiner's rejection of claims 38-40 and 55 under 35 U.S.C. § 112, second paragraph, has been withdrawn by the examiner (answer, page 10).

BACKGROUND

Appellants' invention relates to suppressing electromagnetic radiation in and around printed circuit boards (page 1). Specifically, the device includes a printed circuit board, and at least two electrical connectors proximate to the printed circuit board, with the at least two electrical connectors spaced to attenuate at least one prespecified frequency electromagnetic energy waveform (page 3). An understanding of the invention can be derived from a reading of exemplary claim 1, which is reproduced as follows:

1. A device comprising:

a printed circuit board; and

at least two electrical connectors proximate to said printed circuit board, said at least two electrical connectors spaced to attenuate at least one prespecified frequency electromagnetic energy waveform.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Zhu	5,703,760	Dec. 30, 1997
Schuchmann et al. (Schuchmann)	5,729,183	Mar. 17, 1998
Oberstarr	5,975,920	Nov. 2, 1999 (filed May 16, 1996)
Swamy et al. (Swamy)	5,987,553	Nov. 16, 1999 (filed Sep. 22, 1997)



2002) for appellants' arguments thereagainst. Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the brief have not been considered. See 37 CFR 1.192(a).

#### OPINION

In reaching our decision in this appeal, we have carefully considered the subject matter on appeal, the rejections advanced by the examiner, and the evidence of anticipation and obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, appellants' arguments set forth in the briefs along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

Upon consideration of the record before us, we reverse. We begin with the rejection of claims 1, 2, 4, 9, and 10 under 35 U.S.C. § 102(b) as being anticipated by Zhu. To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently. In re Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir.

1997). The examiner's position (answer, pages 3 and 4) is that although Zhu does not discuss electromagnetic wave attenuation, any and every spacing of connectors will inherently cause attenuation interference for a particular set of frequencies (assuming coherent electromagnetic radiation from the connectors). This is an inherent result of electromagnetic wave superposition principles. The examiner additionally asserts (id.) that regarding the limitation that the frequency is prespecified, any spacing between two connectors is inherently related to a set of frequencies because frequency is related to wavelength. The examiner maintains (id.) that "[t]herefore, the limitation that the frequency is prespecified is no different from prespecifying a distance and the distance between connectors is always prespecified in the manufacturing process. The limitation that the connectors are spaced to attenuate energy is merely the recitation of a particular motivation for choosing the spacing."

Appellants assert (brief, page 15) that Zhu does not have the inherent teachings asserted by the examiner, and expressly requests documentary proof of the examiner's determination of inherency. It is argued (brief, pages 16 and 17) that the Summary and General Description of Zhu do not discuss or suggest

anything dealing with attenuation of electromagnetic energy waveforms, and that a finding of inherency made manifest by use of extrinsic evidence is not supportable if it is necessary to prove facts beyond those disclosed in the reference in order to meet the claim limitations. It is further argued (brief, page 17) that extrinsic evidence may be considered when it is used to explain, but not expand the meaning of a reference. It is further argued (brief, page 19) that claims 1-38 recite "'at least two electrical connectors spaced to attenuate at least one **prespecified** frequency electromagnetic energy waveform'."

Appellants assert (id.) that in appellants' claim recitations, the frequency is prespecified and the spacing is then made such that the prespecified frequency is attenuated. It is argued that in the examiner's mischaracterization of the claim limitations, the frequency to be attenuated is a function of prespecified distance.

In response, the examiner (answer, page 9) relies upon the textbook University Physics, 6th. ed., Sears, Zemansky, and Young, 1982, as documentary proof to support the examiner's determination of inherency. The examiner argues (id.) that the phenomena of wave attenuation is a natural consequence of the principle of linear superposition of two waveform sources

emitting coherently, and (answer, page 10) that the fact that Zhu does not disclose this basic wave phenomena does not preclude the phenomena from occurring.

Appellants respond (reply brief, page 2) that the examiner provides no evidence that Zhu has "coherent" electromagnetic radiation. It is argued (id.) that if, as the examiner maintains, electromagnetic energy attenuation is inherent in any and every spacing of connectors, then the mother and daughter boards described in appellants' background presumably would not have cans or fences. Appellants further argue (id.) that the connectors of Zhu that the examiner is relying upon are in fact used to transfer signals between daughter boards and the mother board, and that the examiner must provide some evidence that the connectors that transfer information as signals also attenuate unwanted signals. It is further argued (id.) that Zhu discloses no more than a conventional mother board and daughter board configuration, and that (reply brief, pages 2 and 3) the examiner has no basis for suggesting that Zhu inherently discloses "'electrical connector spaced to attenuate . . . electromagnetic energy' since the only connectors disclosed by Zhu are edge card connectors that carry information signals. The written description makes clear that the edge card connectors disclosed

by Zhu are not 'electrical connectors spaced to attenuate' as recited by Claim 1."

From our review of Zhu, we find that Zhu is directed to a flexible layout mother board having reduced lateral and vertical profiles for the memory modules seated therein (col. 1, lines 28-39). As shown in Figure 1, circuit card connector slots 10A-10C are mounted on the mother board. Circuit cards 12A and 12B are respectively seated in connector slots 10A and 10B (col. 2, lines 22-27). Figures 2A and 2B show a vertical embodiment of the memory modules. Figures 3A and 3B show a vertical embodiment of the seated memory modules (col. 3, lines 39-43 and col. 4, lines 15-20). Zhu additionally discloses that the industry standard for center-to-center spacing between memory modules is about 0.455 inches (col. 3, lines 65-67). Thus, from the disclosure of Zhu, we find no reference to attenuation of electromagnetic radiation. Turning to University Physics, we find (page 774) that the term interference refers to the situation in which two or more waves overlap in space. The principle of linear superposition (id.) states that when two or more waves overlap, the resultant displacement at any point and at any instant may be found by adding the instantaneous displacements that would be produced at the point by the individual waves if each were

present alone. If the waves are electromagnetic, the displacement means the magnitude of the electric or magnetic field. Constructive interference occurs whenever the path difference for two identical sources is an integer multiple of the wavelength (pages 774 and 775). As shown in figure 41-1, when waves from two sources arrive at a point a half cycle out of phase and the amplitudes are equal, this condition is called destructive interference. The discussion on coherency (page 776) teaches that if light from a single source is split, forming two or more secondary sources, any random change in phase, affects the secondary sources equally and does not change their relative phase. Two such sources derived from a single source and having a definite phase relation are said to be coherent.

From our review of the evidence provided by the examiner, we agree with the examiner that the connectors of Zhu will inherently cause some electromagnetic energy to be created when transmitting signals between the mother board and the memory modules or circuit cards. We additionally agree with the examiner to the extent that there will inherently be some (i.e., negligible) attenuation of electromagnetic waveforms generated. However, it is at this point that we part company with the examiner. We agree with appellants (reply brief, page 2) that if

electromagnetic energy attenuation is inherent in any and all connectors, the mother and daughter boards described in the Background of appellants specification would presumably not have cans or fences; i.e., we find that if the attenuation was sufficient to suppress more than a negligible amount of electromagnetic radiation, the prior art would not have needed fences or cans. As stated in In re Oelrich, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981) (quoting Hansgirg v. Kemmer, 102 F.2d 212, 214, 40 USPQ 665, 667 (CCPA 1939)) (internal citations omitted):

Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. If, however, the disclosure is sufficient to show that the natural result flowing from the operation as taught would result in the performance of the questioned function, it seems to be well settled that the disclosure should be regarded as sufficient.

From our review of the record, we agree with appellants (reply brief, page 2) that there is no evidence provided by the examiner to support the examiner's assumption that the two separate connectors of Zhu produce coherent electromagnetic radiation. It is not enough that it is possible or probable that the connectors of Zhu could produce coherent radiation. To establish a prima facie case of anticipation, it is necessary

that the coherency of the sources is a natural result of the operation of the disclosure of Zhu. This, the examiner has not shown.

Turning to the issue of whether Zhu inherently discloses attenuation of a prespecified waveform, although we agree with the examiner that the frequency of an electromagnetic waveform may be calculated from the distance between the connectors, this is not the same as prespecifying a frequency to be attenuated by spacing of the connectors. Because the examiner has not shown that Zhu inherently prespecifies a frequency to be attenuated by spacing the connectors, we find that the evidence relied upon by the examiner is insufficient to establish inherency of the invention recited in claim 1. Accordingly, the rejection of claim 1, along with claims 2, 4, 9, and 10, dependent therefrom, under 35 U.S.C. § 102(b) as being anticipated by Zhu is reversed.

We turn next to the rejection of claims 11-14, 16, 20, 21, 23-29, 31, 33-42, 44, 49-56, 58, 63-73, 75, and 79-82 under 35 U.S.C. § 103(a) as being unpatentable over Zhu. In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to

make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole. See id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785,

788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

We do not sustain the rejection of claims 11-14, 16, 20, 21, 23-29, 31, 33-42, 44, 49-56, 58, 63-73, 75, and 79-82 because there is no evidence in the record to establish that an artisan would have been motivated to space the connectors of Zhu to attenuate at least one prespecified frequency electromagnetic energy waveform, as required by independent claims 13 and 28, or to provide a virtual fence against at least one prespecified frequency electromagnetic energy waveform as recited in independent claims 39, 53, and 70. Accordingly the rejection of claims 11-14, 16, 20, 21, 23-29, 31, 33-42, 44, 49-56, 58, 63-73, 75, and 79-82 under 35 U.S.C. § 103(a) is reversed.

In addition, we do not sustain the rejection of claims 3, 5-8, 15, 17-19, 22, 30, 32, 34, 35, 43, 45-48, 57, 59-62, 74, and 76-78, because the additional references to Schuchmann, Swamy, Oberstarr, and Wojnarowski do not make up for the basic deficiencies of Zhu. Accordingly, the rejection of claims 3, 5-8, 15, 17-19, 22, 30, 32, 34, 35, 43, 45-48, 57, 59-62, 74, and 76-78 under 35 U.S.C. § 103(a) is reversed.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1, 2, 4, 9, and 10 under 35 U.S.C. § 102(b) is reversed. The decision of the examiner to reject claims 3, 5-8, and 11-82 under 35 U.S.C. § 103(a) is reversed.

REVERSED

JERRY SMITH	)	
Administrative Patent Judge	)	
	)	
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	)	
	)	BOARD OF PATENT
ANITA PELLMAN GROSS	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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STUART S. LEVY	)	
Administrative Patent Judge	)	

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