

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

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* CLINTON S. HARTMANN

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Appeal No. 2006-1607  
Application 10/062,894<sup>1</sup>

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ON BRIEF

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Before BARRETT, LEE, and MEDLEY, *Administrative Patent Judges*.

BARRETT, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134(a) from the final rejection of claims 1-20.

We reverse, but enter a new ground of rejection as to claims 1-10.

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<sup>1</sup> Application for patent filed January 30, 2002, entitled "Modulation by Combined Multi-Pulse Per Group with Simultaneous Phase and Time Shift Keying and Method of Using the Same," published as US2003/0142742, on July 31, 2003.

## BACKGROUND

Figures 1A-1D are said to illustrate "a conventional prior art digital pulse position modulation (PPM) method where data is encoded by a pulse 120 located in one of four pulse positions 110" (¶ 0023). "The four pulse positions 110 can also be viewed as being located in a group of four slots. By changing the position of the pulse 120 within the group of slots over a discrete span of time the data or information in the sample is transmitted." (¶ 0024-0025.) "Referring again to FIGS. 1A-1D and FIG. 2, one group of four slots permits the transmission of only binary bits of data when conventional PPM techniques are employed." (¶ 0030.) What is described is "digital pulse position modulation," where a group of binary digits is represented by a single pulse occurring in one of a series of time slots, as opposed to ordinary PPM where the pulse can occur at any time within a range to represent an analog value. PPM may be understood from the description of the prior art in Fig. 1 of Devon.

Appellant's invention has two aspects: (1) pulse code modulation (PCM) instead of PPM; and (2) alternating phase encoding. In PCM, binary digits are represented by a time period divided up into a group of time slots, where each time position of a slot may have either a pulse (representing a binary "1") or no pulse (representing a binary "0"). The pulses within a time period encode digital data. See W. David Gregg, *Analog and Digital Communication* (John Wiley & Sons, Inc. 1977), p. 377, Fig. 11(a), (b). The digital data could represent an analog signal or any digital data. PCM has been well known for a long time.

Pulses are normally shaped so that the skirt of a pulse is zero at multiples of the time period  $T_{min}$  so that the peak of a pulse being measured is unaffected by neighboring pulses,

which minimizes the "inter-symbol interference" between pulses (§ 0027; Fig. 2). When pulses are spaced more closely than  $T_{min}$ , e.g.,  $T_{min}/5$  in Fig. 3, it is hard to detect the pulse because the overlapping neighboring pulses cause interference (§§ 0034-0035). Appellant discloses that the pulses can be more positively discriminated when each pulse has a different phase from its adjacent pulse (§§ 0036-0037), and discloses interleaving in-phase (I) and quadrature (Q) phases so the  $T_{min}$  spacing can be separately applied to each sub-group (§ 0045). The description in the specification could be clearer. Appellant shows real and imaginary parts of pulses in Figs. 5A and 5B, but it is not clear how a "baseband" (i.e., not modulated on a carrier wave) pulse can have an imaginary part, unless appellant just means that the imaginary parts are intended to be modulated and sent out in quadrature to the real part. A logical "1" is sent by a pulse and a logical "0" is implicitly sent by not having a pulse in the time slot. In effect, appellant's method is two interleaved PCM bit streams, each with a different phase, where the  $T_{min}$  spacing is separately applied to the pulses in each bit stream (§ 0045).

Claims 1 and 11 are reproduced below.

1. A propagated signal, comprising:

a time period divided into a group of time slots each having a unique phase/time position; and

multiple pulses distributed among said time slots encoding a data element by said unique phase/time position.

11. A method of propagated [sic, propagating] a signal, comprising:

designating a time period divided into a group of time slots each having a unique phase/time position; and

distributing multiple pulses among said time slots to encode a data element by said unique phase/time position.

#### THE REFERENCE

The examiner relies on the following reference:

Devon et al. (Devon)	5,684,871	November 4, 1997
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#### THE REJECTIONS

Claims 1-3 and 11-13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Devon.

Claims 4-10 and 14-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Devon.

We refer to the final rejection entered May 6, 2004, and the examiner's answer (pages referred to as "EA\_\_") entered July 27, 2005, for a statement of the examiner's rejection, and to the brief (pages referred to as "Br\_\_") received May 9, 2005, and reply brief (pages referred to as "RBr\_\_") received September 30, 2005, for a statement of appellant's arguments thereagainst.

## DISCUSSION

### *Claim interpretation*

Appellant argues that the limitation of a "unique phase/time position" requires each slot to have both a unique phase *and* a unique time position and that this is not taught by Devon. The examiner interprets "phase/time" to be "either phase or time." More accurately, since the word "position" is associated with the word "time," the examiner interprets "unique phase/time position" to be either a "unique phase" *or* a "unique time position." Appellant argues that "[t]he specification is clear that a pulse in a specific time slot is distinguishable from a pulse in another slot by both time and phase" (Br5). As a matter of grammar, the slash, sometimes called the virgule, is commonly used in three situations: to indicate an alternative between two words (e.g., "and/or," "his/her"), to clarify and join two words where the slash serves to emphasize the relationship between the two words it unites (e.g., in "grandmother/guardian," the woman is not only the boy's grandmother; she is also his guardian; the two alternatives are equally important and applicable), or to indicate line separation when quoting poetry. *See Grammatically Correct*, "<http://www.uhv.edu/ac/student/writing/grammartip011006.htm>, 8/18/06" (not prior art). Thus, the examiner's interpretation is grammatically correct. While we understand what appellant intends to claim, there is no reason why, during prosecution when the claims can be amended, the claims are not amended to precisely define the invention without impliedly reading in limitations from the specification. The claims could be easily amended to recite a "unique phase and time position" or, even more clearly, a "unique phase and a unique time position."

### *Analysis*

Devon teaches "a time period divided into a group of time slots each having a unique *time* position" because each of the pulse windows P1-P5 necessarily has a unique time position.

Appellant argues that "because Devon only provides for one pulse per group of pulses, it does not anticipate encoding data using multiple pulses distributed among a group of time slots and is not, as such, an anticipating reference with respect to independent Claims 1 and 11" (Br6).

The examiner responds (EA5):

Devon clearly states that "three keys are used to encode each symbol: the frequency of the synchronization one [sic, tone] burst, the frequency of the signal tone burst, and the pulse position of the signal tone burst" (col. 6, lines 36-39). Therefore, as evidenced in Fig. 2, element 210 for instance, there are "multiple pulses" used to encode the signal and more than one "slot" are used for such encoding (col. 6, lines 44-48).

Appellant argues that there is only one signal in each group of pulse positions. "The signal may differ as to frequency or the carrier signal for the pulse, but it still is standard pulse position modulation that utilizes other signal processing techniques, such as varying the carrier signal and using a different pulse frequency, to carry more data. Notwithstanding the technique used, Devon only describes fundamental pulse position modulation with one pulse in a frame of pulse positions." (RBr2.)

We agree with appellant. The limitation "multiple pulses distributed among said time slots encoding a data element by said unique phase/time position" requires "multiple pulses distributed among said time slots" to perform the function of "encoding a data element by said unique *time* position" (as interpreted by the examiner, it is unnecessary to also show a unique *phase*). Devon disclose that the data is encoded three ways: frequency of the synchronization tone burst, frequency of the signal tone burst, and the pulse position of the signal tone burst. As

a matter of elementary claim interpretation, since the claims are open-ended, they do not preclude encoding by more than one method. Nevertheless, Devon discloses only *one* pulse that encodes a data element by its unique time position: the signal tone burst in one of the five pulse windows P1-P5 in Fig. 2. The examiner's finding that "there are 'multiple pulses' used to encode the signal and more than one 'slot' are used for such encoding" (EA5) does not fit the claim language. The synchronization pulse does not encode a data element by its "unique time position," because its time position is fixed. Only the signal tone burst encodes by its "unique time position." For this reason, the anticipation rejection of claims 1-3 and 11-13 is reversed. It is noted that the claims (as interpreted to only require *time* position) would be anticipated by a conventional PCM scheme, as in the Gregg reference. Since no additional prior art is added for the obviousness rejection, the rejection of claims 4-10 and 14-20 is also reversed.

#### NEW GROUND OF REJECTION UNDER 37 CFR § 41.50(b)

Claims 1-10 are rejected under 35 U.S.C. § 101 as being directed to nonstatutory subject matter. "Signals" are not statutory subject matter. A case involving this issue is presently on appeal to the Federal Circuit: *In re Nuijten*, No. 06-1301.

Claim 1 is directed to a "propagated signal" having certain characteristics. A man-made signal represents coded information. A signal can be an abstract quantity describing the information or a measurable physical quantity (e.g., the fluctuations of an electrical quantity, such as voltage) containing information. *See In re Walter*, 618 F.2d 758, 770, 205 USPQ 397, 409 (CCPA 1980) ("The 'signals' processed by the inventions of claims 10-12 may represent

either physical quantities or abstract quantities; the claims do not require one or the other"). The signal of claim 1 is not recited to have any specific physical form, i.e., it is not expressly or impliedly an electrical or electromagnetic signal. Nevertheless, since the signal is "propagated" and has a time period divided into a group of time slots, we interpret the signal to be a time varying physical signal instead of just an abstract quantity, such as a data format.

The signal of claims 1-10 is considered to be nonstatutory subject matter because a "signal" or a "propagated signal" does not fall within one of the four statutory categories of subject matter under 35 U.S.C. § 101.

The categories of statutory subject matter are "process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. "[N]o patent is available for a discovery, however useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. § 101." *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 483, 181 USPQ 673, 679 (1974).

A "process" is a series of acts and, since claims 1-10 do not recite acts, it is not a process. Compare the method of propagating a signal in claims 11-20, which are not rejected.

The three product classes of machine, manufacture, and composition of matter have traditionally required physical structure or substance. "The term machine includes every mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result." *Corning v. Burden*, 56 U.S. 252, 267 (1854); *see also Burr v. Duryee*, 68 U.S. 531, 570 (1863) (a machine is a concrete thing, consisting of parts or of certain devices and combinations of devices). Machines do not have to have moving parts. In

modern parlance, electrical circuits and devices, such as computers, are referred to as machines.

The signal of claim 1 has no concrete tangible physical structure, and does not itself perform any functions. Therefore, a signal does not fit within the definition of a "machine."

A "manufacture" and a "composition of matter" are defined in *Diamond v. Chakrabarty*, 447 U.S. 303, 308, 206 USPQ 193, 196-97 (1980):

[T]his Court has read the term "manufacture" in accordance with its dictionary definition to mean "the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery." *American Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1, 11 (1931). Similarly, "composition of matter" has been construed consistent with common usage to include "all compositions of two or more substances and ... all composite articles, whether they be results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids." *Shell Development Co. v. Watson*, 149 F. Supp. 279, 280 (D.C. 1957) (citing 1 A. Deller, *Walker on Patents* § 14, p. 55 (1st ed. 1937)). [Parallel citations omitted.]

The signal is not composed of matter and is clearly not a "composition of matter."

A "manufacture" is the residual category for products. 1 Chisum, *Patents* § 1.02[3] (2004) (citing W. Robinson, *The Law of Patents for Useful Inventions* 270 (1890)). If a signal falls within any category of § 101, it must fall within this category. The definition of "manufacture" from *Diamond v. Chakrabarty* requires a tangible article prepared from materials. "Tangible" refers to something that is discernible by touch. The other cases dealing with manufactures also require a tangible physical article. The CCPA held in *In re Hruby*, 373 F.2d 997, 153 USPQ 61 (CCPA 1967) that there was no distinction between the meaning of "manufacture" in § 101 and "article of manufacture" in § 171 for designs. The issue in *Hruby* was whether that portion of a water fountain which is composed entirely of water in motion was

an article of manufacture. The CCPA relied on the analysis of the term "manufacture" in *Riter-Conley Mfg. Co. v. Aiken*, 203 F. 699 (3d Cir.), a case involving a utility patent. The CCPA stated in *Hruby*: "The gist of it is, as one can determine from dictionaries, that a manufacture is anything made 'by the hands of man' from raw materials, whether literally by hand or by machinery or by art." 373 F.2d at 1000, 153 USPQ at 65. The CCPA held that the fountain was made of the only substance fountains can be made of--water--and determined that designs for water fountains were statutory. Articles of manufacture in designs manifestly require physical matter to provide substance for embodiment of the design. Since an "article of manufacture" under § 171 has the same meaning as a "manufacture" under § 101, it is inevitable that a manufacture under § 101 requires physical matter.

Some further indirect evidence that Congress intended to limit patentable subject matter to physical things and steps is found in 35 U.S.C. § 112, sixth paragraph, which states that an element in a claim for a combination may be expressed as a "means or step" for performing a function and will be construed to cover the corresponding "structure, material, or acts described in the specification and equivalents thereof." "Structure" and "material" indicate tangible things made of matter, not energy.

The signal of claims 1-10 does not have any tangible physical structure or substance and does not fit the definition of a "manufacture" which requires a tangible object.

Our conclusion that a "signal" does not fit within any of the four categories of § 101 is consistent with *In re Bonczyk*, 10 Fed. Appx. 908 (Fed. Cir. 2001) (unpublished) ("fabricated energy structure" does not correspond to any statutory category of subject matter and it is unnecessary to reach the alternate ground of affirmance that the subject matter lacks practical utility) and with the *Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility*, 1300 Off. Gaz. Patent and Trademark Off. (O.G.) 142, 152 (Nov. 22, 2005), in the section entitled "Electro-Magnetic Signals." Although the *Manual of Patent Examining Procedure* § 2106(IV)(B)(1)(c) implies that "signals" may be statutory subject matter, the MPEP is not binding on the Board. It is noted that the "useful, concrete and tangible result" test of *State St. Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998), does not apply because that test was enunciated in the context of "transformation of data by a machine." We defer to our reviewing court, the U.S. Court of Appeals for the Federal Circuit to make the decision on whether non-tangible and/or non-physical things constitute patentable subject matter under 35 U.S.C. § 101. The Federal Circuit cannot address rejections that it does not see. *See Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 972, 63 USPQ2d 1609, 1619 (Fed. Cir. 2002) (Lourie, J., concurring in decision not to hear the case en banc) ("As for the lack of earlier cases on this issue, it regularly happens in adjudication that issues do not arise until counsel raise them, and, when that occurs, courts are then required to decide them.").

In summary, the signal of claims 1-10 is unpatentable subject matter because it does not fall within any category of § 101.

#### CONCLUSION

The rejections of claims 1-20 are reversed.

A new ground of rejection has been entered as to claims 1-10 under 35 U.S.C. § 101.

This decision contains new grounds of rejection pursuant to 37 CFR § 41.50(b) (2005). 37 CFR § 41.50(b) provides that "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 CFR § 41.50(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .

(2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (2004).

REVERSED - 37 CFR § 41.50(b)

LEE E. BARRETT	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
JAMESON LEE	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
	)	
SALLY C. MEDLEY	)	
Administrative Patent Judge	)	

Attachments:

W. David Gregg, *Analog and Digital Communication*  
(John Wiley & Sons, Inc. 1977), p. 377

*Grammatically Correct*, "<http://www.uhv.edu/ac/student/writing/grammartip011006.htm>"

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