

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today  
(1) was not written for publication in a law journal and  
(2) is not binding precedent of the Board.

Paper No. 24

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte PATRICK K. SULLIVAN

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Appeal No. 1998-0061  
Application 08/364,101<sup>1</sup>

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ON BRIEF

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Before MCCANDLISH, Senior Administrative Patent Judge, COHEN  
and GONZALES, Administrative Patent Judges.

MCCANDLISH, Senior Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal from the examiner's final  
rejection of claims 1 through 20. No other claims are pending  
in the application.

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<sup>1</sup>Application for patent filed December 27, 1994.

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Appellant's invention relates to an apnea and SIDS monitoring method (claims 1-10) and to an apnea monitoring apparatus (claims 11-20). The apparatus comprises a piezoelectric pad 1 (which may be in the form of a sheet) and a computer 2 electrically connected to the piezoelectric pad. The piezoelectric pad is located in a patient's proximity and may underlie the patient to produce a voltage signal having components representative of the patient's heartbeat and respiration rates. The computer is programmed to perform a calculation, such as a Fourier analysis,<sup>2</sup> on the voltage signal produced by the piezoelectric pad to provide displayable spectral energy peaks indicative of the patient's heartbeat and respiration rates.

The method defined in appealed claim 1 comprises the steps of communicating the patient's acoustic and electromechanical transmissions to the piezoelectric pad, calculating an energy spectrum from the resulting voltage signal produced by the piezoelectric pad, and characterizing

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<sup>2</sup> It is well known that a Fourier analysis is a process of analyzing a complex wave by separating it into a plurality of component waves, each have a particular frequency, amplitude and phase displacement.

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peaks in the energy spectrum as heart and respiration rates. The apparatus defined in claim 11 comprises the piezoelectric pad for producing the voltage signal from the patient's acoustic and electromechanical transmissions, the processor for calculating the energy spectrum from the pad's voltage signal and a comparator for "comparing peaks in the energy spectrum and characterizing the peaks as heart and respiration rates."

A copy of the appealed claims is appended to appellant's brief.

The following references are relied upon by the examiner as evidence of obviousness in support of his rejections under 35 U.S.C. § 103:

Salem et al. (Salem)	4,889,131	Dec. 26, 1989
Nedivi	5,002,060	Mar. 26, 1991
Fraden (UK)	2 138 144	Oct. 17, 1984

Claims 1 through 8, 10 through 18 and 20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Fraden in view of Nedivi, and claims 9 and 19 stand rejected under 35 U.S.C.

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§ 103 as being unpatentable over Fraden in view of Nedivi and Salem. Claims 6 and 14 additionally stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which appellant regards as his invention. Reference is made to the examiner's answer, to the examiner's first office action (Paper No. 4) and to the examiner's final office action (Paper No. 6) for details of these rejections.<sup>3</sup>

We cannot sustain the rejection of claims 6 and 14 under the second paragraph of § 112. With respect to claim 6, the examiner's position as set forth on page 2 of the final office action (Paper No. 6) is misplaced. It is the function of the specification, not of the claims, to set forth how to practice the invention. See In re Johnson, 558 F.2d 1008, 1017, 194 USPQ 187, 195 (CCPA 1977). With regard to claim 14, the failure to refer to the peaks as "said peaks" does not obscure the metes and bounds of the claimed invention. In the final analysis, we are satisfied that claims 6 and 14 set out and

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<sup>3</sup> The rejection of the appealed claims under 35 U.S.C. § 112, first paragraph, was withdrawn by the examiner in the supplemental answer (Paper No. 23) mailed September 17, 1997.

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circumscribe the claimed invention with a reasonable degree of precision and particularity. Id. at 1015, 194 USPQ at 193.

With regard to the § 103 rejection of claims 1 through 8, 10 through 18 and 20, the Fraden reference discloses a method and apparatus in which a piezoelectric pad 10 is electrically connected to a monitoring device 38 for monitoring a patient's heartbeat and respiration rates in an apnea detecting system (see page 2, lines 72-82 of the Fraden specification). The piezoelectric pad is in the form of a sheet and may be placed on a bed between the patient and a patient support such as a mattress under the mattress sheets so as not to directly contact the patient's body (see page 4, lines 10-16 of the Fraden specification).

Like appellant's piezoelectric pad, Fraden's piezoelectric pad senses the patient's acoustic and electromechanical transmissions to produce a voltage signal having components representative of the patient's heartbeat and respiration rates. The voltage signal is transmitted by a transmitter in the form of a cable 36 to the monitoring device which analyzes the signal to recover the heartbeat and respiration signal components from the complex voltage signal

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for providing a display of the patient's cardiac and respiratory activity (see page 3, lines 55-62 of the Fraden specification). Thus, as far as claims 1 and 11 are concerned, Fraden merely lacks an express disclosure of the particular type of analyzing or monitoring device that produces spectral peaks to represent the patient's heartbeat and respiration rates.

The Nedivi reference also discloses a method and apparatus for monitoring a patient's heartbeat and respiration rates to indicate such conditions as apnea and cardiac failure (see column 3, lines 41-47 of the Nedivi specification). In Nedivi's system a circuit B is responsive to piezoelectric transducers to produce an analog voltage signal having components representing the patient's heartbeat and respiration rates. The analog voltage signal is converted into a digital signal by an analog-to-digital converter C, and the resulting digital signal is processed by a Fourier transform microprocessor F to recover and analyze the signal components representing the patient's heartbeat and respiration rates (see column 3, lines 23-29 of the Nedivi

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specification). The recovered signal components are transmitted to a microcomputer G which displays the rates and which compares those rates with data stored in a RAM memory to produce an alarm if any discrepancies are detected (see column 3, lines 29-47 of the Nedivi specification). There is no argument in appellant's brief that Nedivi's fast Fourier transform processor will not produce spectral energy peaks characterizing the heartbeat and respiration rates in the manner claimed in the appealed claims.

In short, there is no argument that Nedivi's fast Fourier transform processor differs from appellant's fast Fourier transform processor.

Thus, in sum, Fraden suggests the concept of utilizing a single piezoelectric transducer in the form of a pad to sense both the heartbeat and respiration rates of the patient and of analyzing the resulting voltage signal to monitor the heartbeat and respiration rates, while Nedivi suggests the concept of analyzing the digitized forms of the signal components in a fast Fourier transform processor to recover the rate information. According to the examiner (see, for example, page 3 of the final office action (Paper No. 6)), it

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would have been obvious to provide Fraden's apparatus with Nedivi's fast Fourier transform processor (together with the analog-to-digital converter and the rate-comparing microcomputer with the alarm) "to effect superior monitoring of plural signals." We agree. It is well known in the art that a fast Fourier transform processor provides an effective, accurate analysis of a complex voltage signal having different components such as the rate-representing signal components in the present case. The recognition of the beneficial capabilities of a fast Fourier transform processor, which are well known in the art as apparently conceded on page 3 of the main brief, would have been ample motivation for one of ordinary skill to provide Fraden's monitoring system with such a processor.

Appellant has not taken issue with the examiner's findings (see, for example, page 3 of the final office action) regarding the Fraden and Nedivi references. In addition, appellant has not challenged the examiner's above-mentioned statement of motivation for combining the reference teachings. Instead, appellant generally argues on page 15 of the main brief and elsewhere that there is no motivation or suggestion

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for combining the references in the manner proposed by the examiner. We disagree for the specific reasons stated supra.

With regard to the argument in the second full paragraph on page 15 of the main brief, we find no mention of the British Fraden reference in columns 1 and 2 of the Nedivi specification or anywhere else in the Nedivi patent. As noted supra, Fraden does not expressly disclose the particular type of processor for analyzing the plural-component voltage signal transmitted from the piezoelectric pad.

For the foregoing reasons, we are satisfied that the examiner's evidence of obviousness is sufficient to establish a prima facie case of obviousness with respect to claims 1 and 11 as well as other appealed claims. This prima facie case has not been rebutted by appellant. Accordingly, we will sustain the § 103 rejection of claims 1 and 11.

We will also sustain the examiner's § 103 rejection of dependent claims 2 through 8, 10, 12 through 18 and 20. Merely reiterating what each of these dependent claims recites as appellant has done on pages 12-14 of the main brief does not amount to an argument that these dependent claims are

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patentable separately of the claims from which they depend.

In short, appellants have failed to argue the patentability of these dependent claims with any reasonable specificity. They therefore fall with their respective parent claims. See In re Nielson, 816 F.2d 1567, 1572, 2 USPQ2d 1525, 1528 (Fed. Cir. 1987). In any event, these dependent claims are considered to be unpatentable over the applied references for the reasons stated supra as well as the reasons stated by the examiner.

With regard to dependent claims 9 and 19, Salem suggests the concept of providing for the wireless transmission of heart and respiration rate signals from a patient to a remote monitor. The advantages of such a wireless transmission are well known and self-evident in that it eliminates the need for a cable or other physical connection as well as permitting virtually unrestrained mobility of the patient with respect to the remote monitor. These advantages would have been ample motivation for one of ordinary skill in the art to provide for the wireless transmission of the heart and respiration rate signals in Fraden's system. Accordingly, we will also sustain the § 103 rejection of claims 9 and 19.

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In summary, the § 112, second paragraph, rejection of claims 6 and 14 is reversed and the § 103 rejections of claims 1 through 20 are affirmed.

Since at least one rejection of each appealed claim has been sustained, the examiner's decision rejecting the appealed claims is affirmed.

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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).

AFFIRMED

	Harrison E. McCandlish, Senior	)	
	Administrative Patent Judge	)	
		)	
		)	
		)	
	Irwin Charles Cohen	)	BOARD OF
PATENT	Administrative Patent Judge	)	APPEALS AND
		)	INTERFERENCES
		)	
		)	
	John F. Gonzales	)	
	Administrative Patent Judge	)	

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