

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 9

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte DIPEN N. SINHA

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Appeal No. 1998-1603  
Application No. 08/428,940<sup>1</sup>

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ON BRIEF

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Before CALVERT, ABRAMS, and CRAWFORD, Administrative Patent Judges.

CRAWFORD, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 through 4, which are all of the claims pending in this application.

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<sup>1</sup> Application for patent filed April 25, 1995.

Appeal No. 1998-1603  
Application No. 08/428,940

The appellant's invention relates to a method of measuring changes in intracranial pressure (ICP) of a subject which includes the step of measuring the phase difference between a detected resonant vibration and the applied ultrasonic excitation. An understanding of the invention can be derived from a reading of exemplary claim 1, which appears in the appendix to the appellant's brief.

The Prior Art

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

Kageyama et al. (Kageyama)	4,971,061	Nov. 20,
1990		
Mick	5,074,310	Dec.
24, 1991		
Kaufman et al. (Kaufman)	5,309,898	May
10, 1994		

(filed Oct. 13,  
1993)

"Noninvasive Pressure Measurement," by D. Devine, III et al., IBM Technical Disclosure Bulletin (Vol. 20, No. 8, January/1978)  
(Devine).

The Rejections

Claims 1, 2 and 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over Mick in view of Kageyama and Devine.

Claim 3 stands rejected under 35 U.S.C. § 103 as being unpatentable over Mick in view of Kageyama and Devine as applied above, and further in view of Kaufman.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the examiner's answer (Paper No. 8, mailed January 7, 1997) for the examiner's complete reasoning in support of the rejections, and to the appellant's brief (Paper No. 7, filed October 10, 1996) for the appellant's arguments against the rejections.

#### OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

We turn first to the examiner's rejection of claims 1, 2 and 4 under 35 U.S.C. § 103 as being unpatentable over Mick in

view of Kageyama and Devine. In support of the rejection, the examiner states:

. . . Mick shows a method and apparatus for non-invasive measurement of intracranial changes in pressure in which a pre-determined signal (Col. 6, Lns. 9-11) of a particular frequency, the fundamental resonant frequency is known for the skull (Col. 5, Lns. 64-66), is applied to the skull, an output is detected at another location on the skull and the variations between the input signal and the resultant signal are measured. Mick however, does not show the application of an ultrasonic oscillatory excitation applied to the head or the generation of a standing wave.  
[Examiner's answer at page 3-4].

The examiner has cited Kageyama for showing the utilization of ultrasonic waves from a pulser for excitation in an analogous art for the purpose of measuring their echo to determine intracranial pressure. The examiner concludes:

It would have been obvious for a person of ordinary skill in the art at the time this invention was made to incorporate the use of ultrasonic waves because they are commonly used wave frequency for medical applications.  
[Examiner's answer at page 4].

Appellant argues that Mick does not disclose the application of a single frequency to the skull bone, i.e., Mick does not

disclose "choosing a frequency for said step of ultrasonic oscillatory excitation such that the detected vibration corresponds to a resonance in the skull bone" as recited in claim 1. In addition appellant argues that Mick does not disclose that only the phase between the applied excitation and the detected vibration be determined to affect the measurement.

The examiner argues:

However, in Claim 1 there is no language that indicates a specific standing wave, a specific vibration or a specific frequency must be chosen. The language only claims "a standing wave", "a frequency" and "the detected vibration" are of concern and does not preclude the generation of numerous standing waves, the choosing of multiple frequencies or the detection of numerous vibrations.

Similarly, there is no indication in the Claim 1 language that a single resonant peak is to be measured or that a single frequency be applied to the skull bone. [Examiner's answer at page 6].

We do not agree with the examiner. The specification discloses:

At specific frequencies, there are resonance peaks in the response of the skull which can be detected by sweeping the excitation frequency on an excitation

transducer in contact with the subject's head, while monitoring the standing wave characteristics of the signal received on the second, receiving transducer, likewise in contact with the subject's head (both, typically on the forehead). One such characteristic is the phase difference between these two signals at a chosen frequency which has been found to be related to the intracranial pressure and changes therein. [Specification at page 4].

The specification further discloses that if a frequency corresponding to the skull bone resonance is selected, effects of stress due to change in ICP are substantially magnified and further discloses the method of the invention thusly:

Once any one of the several resonance frequencies are found, that particular frequency is kept fixed and only the phase output is monitored. [Specification at page 5].

In view of the disclosure in the specification, it is our view that the language "choosing a frequency for said step of ultrasonic, oscillatory excitation such that the detected vibration corresponds to a resonance in the skull bone" of claim 1 does indeed indicate that a single frequency be applied to the skull bone.

Mick does not disclose the application of a single frequency excitation nor does it disclose the measurement of

the phase difference between the detected resonant vibration and the applied excitation. Rather, Mick discloses that a mechanical forced oscillation stimulus is transmitted through the bone material and that the frequency response spectrum is measured. (Col. 4, lines 44 to 54). In addition, neither Kageyama nor Devine discloses the application of excitation of a single frequency and the measurement of a phase difference to determine changes in ICP.

Further, Mick discloses that the characteristics of the measured sound signal in the measurement of ICP leads to inaccurate results (Col. 1, lines 46 to 50; Col. 2, lines 40 to 43; Col. 2, lines 53 to 56). As such, in our view there would have been no motivation to replace the mechanical oscillation excitation of Mick with the sound excitation of Kageyama.

In view of the foregoing, we will not sustain the examiner's rejection of claims 1, 2 and 4 under 35 U.S.C. § 103 as unpatentable over Mick in view of Devine.

In addition, we will not sustain the examiner's rejection of claim 3. Claim 3 depends on claim 1 and thus includes the above discussed steps of applying a single frequency

excitation and of measuring the phase difference. We have reviewed Kaufman and determined that Kaufman does not cure the deficiencies of Mick, Kageyama and Devine noted above.

The decision of the examiner to reject claims 1, 2, 3 and 4 under 35 U.S.C. § 103 is reversed.

**REVERSED**

IAN A. CALVERT	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
NEAL E. ABRAMS	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
MURRIEL E. CRAWFORD	)	
Administrative Patent Judge	)	

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APPEAL NO. 98-1603 - JUDGE

APPLICATION NO. 08/428,940

APJ CRAWFORD

APJ CALVERT

APJ ABRAMS

DECISION: **REVERSED**

Prepared By: Gloria Henderson

**DRAFT TYPED:** 27 Oct 00

**FINAL TYPED:**