United States Patent [19]

Maynard

[11] **4,308,873**

[45] **Jan. 5, 1982**

[54] **ELECTROENCEPHALOGRAPH MONITORING**

[75] Inventor: **Douglas E. Maynard,** London, England

[73] Assignee: **National Research Development Corporation,** London, England

[21] Appl. No.: **18,894**

[22] Filed: **Mar. 9, 1979**

[30] **Foreign Application Priority Data**

Mar. 16, 1978 [GB] United Kingdom 10382/78
Oct. 10, 1978 [GB] United Kingdom 40034/78

[51] **Int. Cl.**[3] **A61B 5/04**

[52] **U.S. Cl.** **128/731;** 128/642; 128/643

[58] **Field of Search** 128/639–644, 128/710–712, 731–734, 748, 902, 901

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,599,628	8/1971	Abbenante et al.	128/748 X
3,699,947	10/1972	Maynard	128/731
3,732,859	5/1973	Tateno	128/731
3,826,243	7/1974	Anderson	128/732
3,945,374	3/1976	McClure	128/733
3,951,136	4/1976	Wall	128/642
3,957,036	5/1976	Normann	128/642
4,084,583	4/1978	Hjort	128/731

OTHER PUBLICATIONS

Rosen et al., "The Human Fetal Electroencephalogram", Am. J. Ob. & Gyn., 1969, vol. 104, pp. 1057–1060.

Chacheva, "Fetal EEG", 5th Eur. Cong. of Pernatal Med., Jun., 1976, pp. 116–119.

Zorn et al., "Electroencephalographic Foetele", J. Obs. & Gyn., Biol. Repr., 1974, 3, 1035–1055.

Rosen et al., "Human Fetal Electroencephalogram", Obs. & Gyn., 1976, vol. 36, pp. 132–139.

Mann et al., "Human Fetal . . . Electrode", Am. J. Obs. & Gyn., 1972, vol. 114, pp. 893–903.

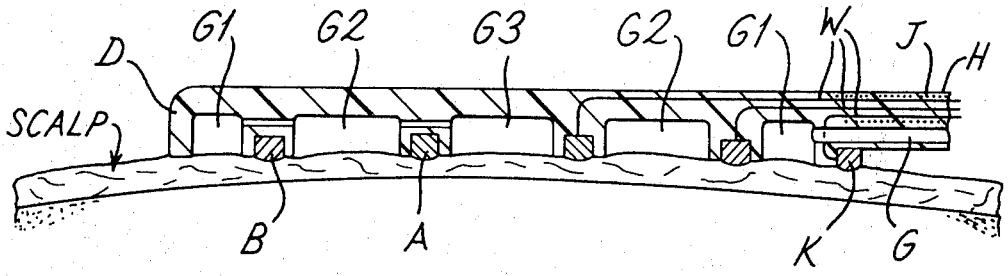
Rosen et al., "An Approach to Study of Brain Damage", Am. J. Ob. & Gyn., 1973, vol. 115, pp. 37–47.

Peltzman et al., "Quan. Analysis of Fetal . . . Data", Am. J. Ob. & Gyn., 1973, vol. 115, pp. 1117–1124.

Primary Examiner—Lee S. Cohen

Attorney, Agent, or Firm—Cushman, Darby & Cushman

[57] **ABSTRACT**

Apparatus for monitoring those signals in the brain which give rise to electroencephalograms (EEG) is described. The apparatus is particularly applicable to the fetus where EEG signals often contain a component of those signals which give rise to electrocardiographs (ECG). In the apparatus ECG signals picked up by electrodes in an electrode assembly forming part of the apparatus are eliminated by deriving two signals having equal ECG components, the two signals being subtracted from one another to provide a signal representing EEG. The electrodes may be concentric annular electrodes, for example, or relatively small disc electrodes spaced apart at the vertices of an equilateral triangle.

12 Claims, 12 Drawing Figures