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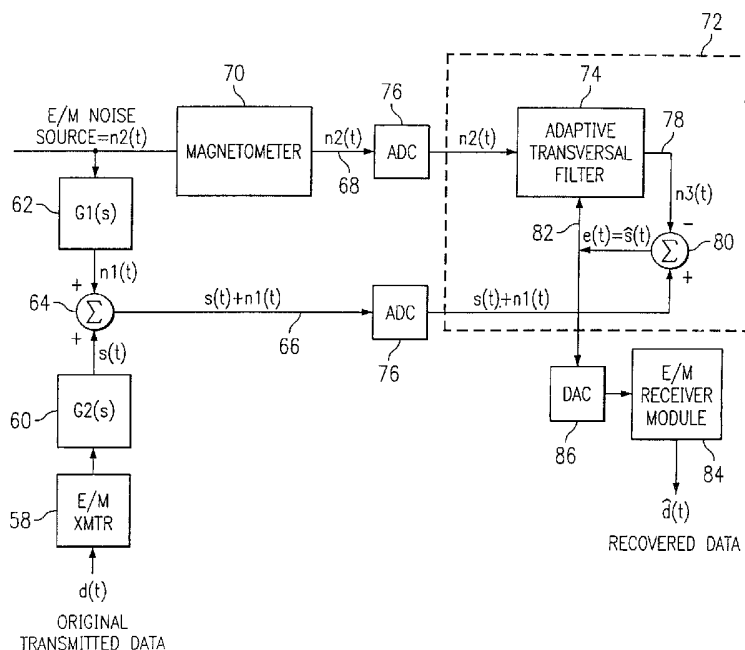
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[Continued on next page]

(54) Title: FILTERS FOR CANCELING MULTIPLE NOISE SOURCES IN BOREHOLE ELECTROMAGNETIC TELEMETRY SYSTEM



(57) Abstract: An electromagnetic borehole telemetry system providing improved signal to noise ratio. Adaptive filters (74) use noise channels (68) as references to remove noise from the signal channel (66). Multiple noise channels are coupled to series connected adaptive filters (74) for removing each noise source from the signal channel. The order of noise removal is selected to remove the most significant first.

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**Declarations under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

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B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 324/326, 207.12, 207.26, 225, 335; 175/45; 340/354.6, 853.1, 853.6, 853.8 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) USPTO APS EAST, WEST		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 6,285,190 B1 (BRUNE et al) 04 September 2001 (04.09.2001), figures 2 & 8.	4-7, 9-14, 17
X --- Y	US 4,980,682 A (KLEIN et al) 25 December 1990 (25.12.1990), figure 3.	15, 16 ----- 17
X	US 5,467,083 A (McDONALD et al) 14 November 1995 (14.11.1996), figure 2A.	1-3, 8, 12
Y	US 4,992,787 A (HELM) 12 February 1991 (12.02.1991), column 4, lines 25-38.	4-7, 9-14
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* "A" "E" "L" "O" "P"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance earlier document published on or after the international filing date document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) document referring to an oral disclosure, use, exhibition or other means document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "G" document member of the same patent family
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Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer JAMES CLINGER Telephone No. (703) 305-0619 