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[Continued on next page]

(54) Title: MEASUREMENT OF SOUND SPEED OF DOWNHOLE FLUID BY HELMHOLTZ RESONATOR

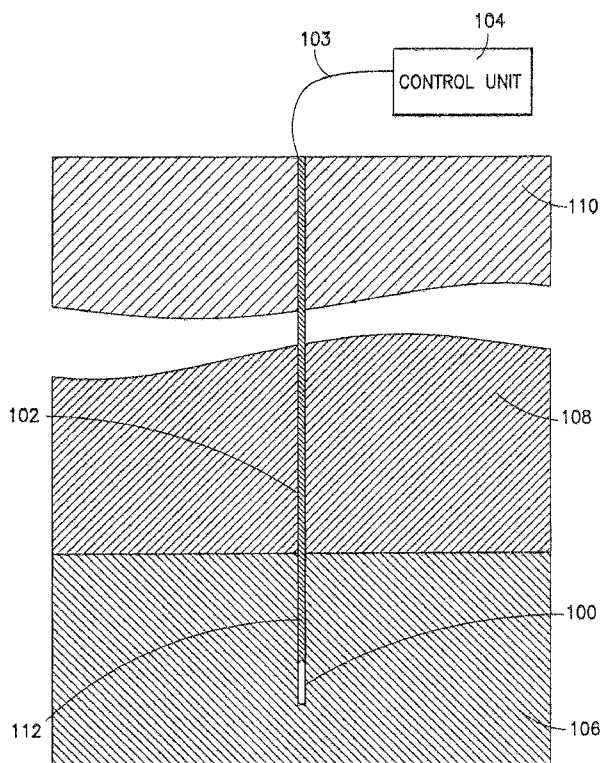


FIG. 1

(57) Abstract: A downhole logging tool is equipped with a modified Helmholtz resonator for facilitating acoustic formation evaluation and reservoir characterization. The resonator permits calculation of sound speed and viscosity of the fluid in the resonator cavity. The presence of gas bubbles in the fluid may also be detected. The modified Helmholtz resonator includes at least two openings so that fluid can flow through the resonator cavity. Because fluid can flow through the resonator cavity, local fluid can be measured under local conditions, e.g., downhole temperature, pressure, and gas influx from formations. Further, the modified Helmholtz resonator utilizes an acoustic signal at or near the frequency of interest for at least some acoustic logging tools.



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<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 890 687 A (MEDLIN WILLIAM L [US] ET AL) 2 January 1990 (1990-01-02)	1-3,6-7, 11-12, 14,17, 21,24
Y	column 1, lines 1-7; figures 2,3 column 2, line 62 - column 5, line 19	9,13,19, 22
X	US 5 171 943 A (BALOGH WILLIAM T [US] ET AL) 15 December 1992 (1992-12-15) column 4, line 1 - column 6, line 18; figures 3a,4,5a,5b	1-3, 11-12
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
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Date of the actual completion of the international search  17 February 2010		Date of mailing of the international search report  23/02/2010
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer  Vollmer, Thorsten

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