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(54) **Multilayer acoustic transducer.**

- (57) An acoustic transducer apparatus comprises a piezoelectric resonator stack which contains active piezoelectric layers (20,20B,20C,20D,20E,20F), internal conductive electrodes (22A,22B,22C,22D,22E,22F), internal bonding layers (25A,25B,25C,25D), and an optional internal dielectric layer (24A,24B). The electrodes may be connected to provide alternating polarization directions, or any other desired sequence of polarization directions, in the sequence of piezoelectric layers. An optional edge dielectric layer (21A,21B,21C,21D,21E,21F), positioned between side electrodes (23A,23B) and adjacent piezoelectric layers, controls the fringe electrical fields and the lateral piezoelectric modes that would otherwise develop. The piezoelectric layers may have uniform thicknesses with independently selected polarization direction within each piezoelectric layer. Alternatively, the individual piezoelectric layers may have non-uniform thicknesses in and independently selected polarization direction within each layer.

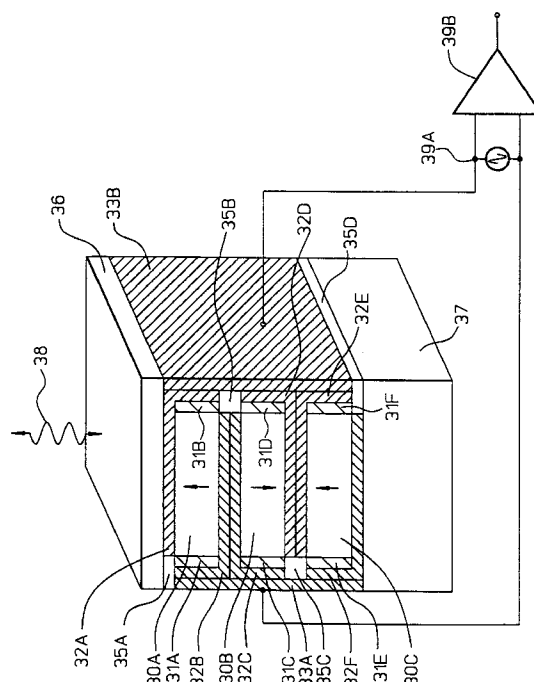


FIG. 3



European Patent
Office

EUROPEAN SEARCH REPORT

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EP 94 30 2655

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	JAPANESE JOURNAL OF APPLIED PHYSICS, SUPPLEMENTS, vol. 28, no. 1, March 1989 TOKYO JA, pages 54-56, XP 000085263 S.SAITOH EA 'A low impedance ultrasonic probe using a multilayer piezoelectric ceramic'	1,6	B06B1/06
Y	* page 54, column 1, line 1 - page 55, column 1, line 16; figures 1,2 *	1-3,10	
Y	US-A-4 803 763 (ETURO YASUDA ET AL) 14 February 1989 * column 3, line 16 - line 32; figures 1,5 * column 4, line 46 - line 58 *	1-3,10	
A	IBM TECHNICAL DISCLOSURE BULLETIN, vol. 15, no. 3, August 1972 NEW YORK, US, pages 928-929, ANONYMOUS 'Fabrication of Multilayer Thin Film Piezoelectric Transducers. August 1972.' * page 928, line 1 - line 22; figure 1 * * page 929, line 10 - line 18 *	4-6,8,9	TECHNICAL FIELDS SEARCHED (Int.Cl.5) B06B
A	PATENT ABSTRACTS OF JAPAN vol. 012 no. 375 (E-666) ,7 October 1988 & JP-A-63 122288 (NEC CORP) 26 May 1988, * abstract *	1	
A	US-A-2 894 317 (S.T.MARKS) 14 July 1959 * figure 1 *	1	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 July 1995	Examiner Haasbroek, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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