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Lindberg

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[54] **MULTIPLE FREQUENCY STEERABLE ACOUSTIC TRANSDUCER**

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[51] **Int. Cl.**[6] **H04R 17/00**

[52] **U.S. Cl.** **367/155**; 367/103; 367/119; 310/334

[58] **Field of Search** 367/153, 155, 367/103, 119; 310/334

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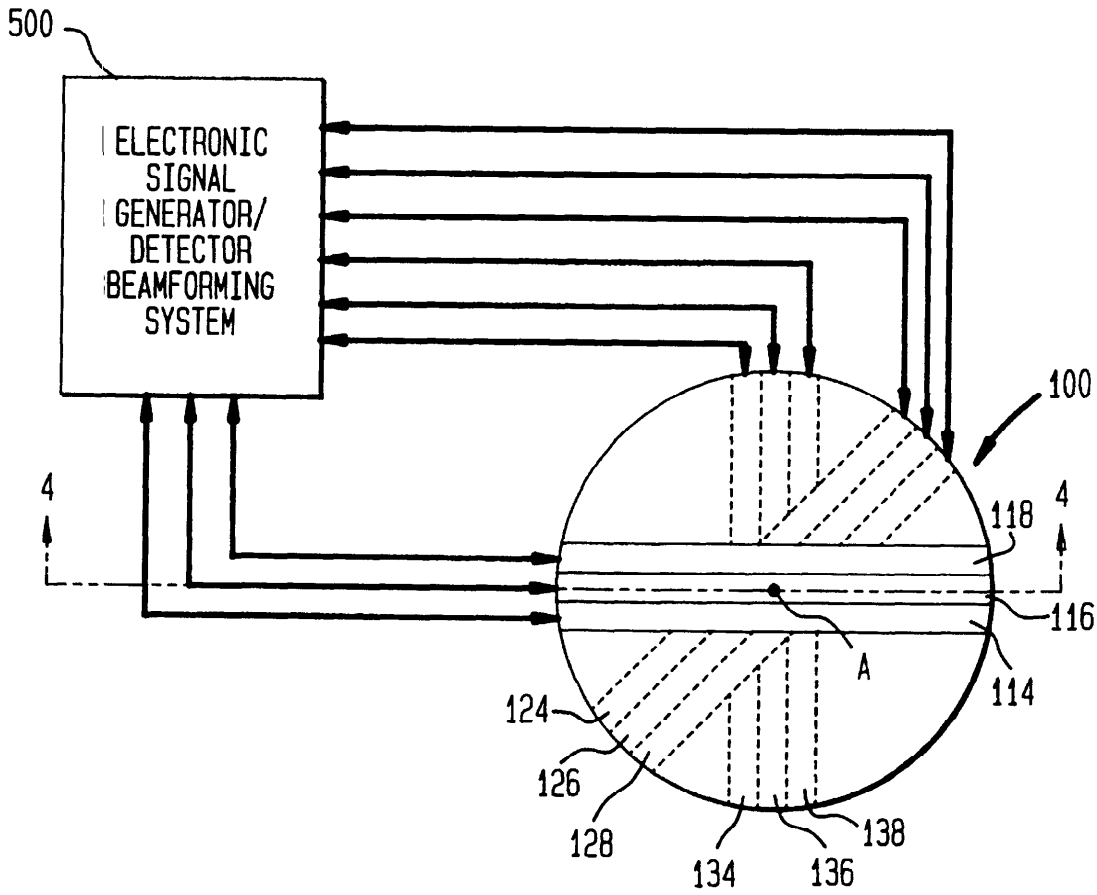
[57] **ABSTRACT**

A multiple frequency acoustic transducer is constructed as a stacked configuration of N groups of multi-layer transducer elements separated from one another by an electrical insulating material. Each multi-layer transducer element in an n-th one of the N groups has a layer of acoustically transparent electroacoustic transducer material whose thickness is determined by the n-th frequency of operation. Each multi-layer transducer element has opposing planar surfaces with electrically conductive material deposited thereon. For each multi-layer transducer element, the electrically conductive material is formed into parallel strips electrically isolated from one another on at least one of each element's opposing planar surfaces. The parallel strips associated with each multi-layer transducer element in any one of the n-th groups have a unique angular orientation in the n-th group.

13 Claims, 4 Drawing Sheets