Claims

What is claimed is:

1. An apparatus comprising:

a housing;

a piezoelectric transducer mounted in the housing;

an impedance matching layer provided between the piezoelectric transducer and the housing;

wherein the impedance matching device includes a plurality of slots extending therethrough, said slots also extending partially through the piezoelectric transducer.

2. The apparatus of claim 1 wherein:

the plurality of slots are circular in shape.

3. The apparatus of claim 1, wherein the piezoelectric transducer is a piezoelectric ceramic disk that includes N independent transducer regions, and wherein the impedance matching layer includes N independent matching layer regions that match and overlay the N independent transducer regions.

4. The apparatus of claim 3, wherein one of a polymer having a low shear stiffness or a fluid is inserted between adjacent ones of the N independent transducer regions.

5. The apparatus of claim 3, wherein each of the N independent matching layer regions has the same acoustic impedance.

6. The apparatus of claim 3, wherein at least one of the N independent matching layer regions has a different acoustic impedance to a different one of the N independent matching layer regions.

7. The apparatus of claim 1, wherein the piezoelectric transducer is cut into a plurality of square elements, wherein said plurality of square elements are connected to form a set of interconnected areas, each interconnected area simulating a ring shaped area.