The purpose of these acoustical patent reviews is to provide enough information for a Journal reader to decide whether to seek more information from the patent itself. Any opinions expressed here are those of the reviewers as individuals and are not legal opinions. Printed copies of United States Patents may be ordered at $3.00 each from the Commissioner of Patents and Trademarks, Washington, DC 20231. Patents are available via the Internet at http://www.uspto.gov.

Reviewers for this issue:

GEORGE L. AUGSPURGER, Perception, Incorporated, Box 39536, Los Angeles, California 90039
SEAN A. FULOP, California State University, Fresno, 5245 N. Backer Avenue M/S PB92, Fresno, California 93740-8001
JEROME A. HELFFRICH, Southwest Research Institute, San Antonio, Texas 78228
DAVID PREVES, Starkey Laboratories, 6600 Washington Ave. S., Eden Prairie, Minnesota 55344
CARL J. ROSENBERG, Acentech Incorporated, 33 Moulton Street, Cambridge, Massachusetts 02138
NEIL A. SHAW, Menlo Scientific Acoustics, Inc., Post Office Box 1610, Topanga, California 90290
ERIC E. UNGAR, Acentech Incorporated, 33 Moulton Street, Cambridge, Massachusetts 02138
ROBERT C. WAAG, Department of Electrical and Computer Engineering, University of Rochester, Rochester, New York 14627

7,898,148
43.38.Ar OSCILLATOR BASED ON PIEZORESISTIVE RESONATORS

Peter Gerard Steeneken and Jozef Thomas Martinus Van Beek, assignors to NXP B.V.
1 March 2011 (Class 310/317); filed in the European Patent Office 30 September 2005

This patent describes one of the new breed of clock oscillators for electronics utilizing microelectromechanical systems. The authors show how doped silicon or gallium arsenide beam-shaped structures can be organized into elements of a piezoresistive bridge circuit incorporating metal-oxide semiconductor transistors for gain. These structures are electroded to provide incorporating capacitive feedback to the beam elements themselves to make the circuit self-resonant. The practically accessible capacitances and transistor dimensions lead to resonance frequencies in the tens of megahertz, and total power consumption of less than 1 mW. This compares favorably with similar frequency quartz resonators, and the packages are generally smaller. However, stability may be a concern for these devices.—JAH

7,899,197
43.38.Bs ELECTROSTATIC TRANSDUCER, DRIVING CIRCUIT OF CAPACITIVE LOAD, METHOD FOR SETTING CIRCUIT CONSTANT, ULTRASONIC SPEAKER, DISPLAY DEVICE AND DIRECTIONAL ACOUSTIC SYSTEM

Shinichi Mayazaki, assignor to Seiko Epson Corporation
1 March 2011 (Class 381/116); filed in Japan 15 November 2005

This is the latest in a series of Seiko Epson patents describing methods for utilizing an electrostatic loudspeaker as a parametric sound generator. In that application, the loudspeaker reproduces an ultrasonic carrier modulated by an audio signal. As most of the energy is concentrated near the carrier frequency, the electroacoustic system can be tuned for maximum efficiency at that frequency. Here, tuning is accomplished by selecting the value of coupling capacitor C1 in relation to the self-inductance of transformer T and the capacitive load of the transducer. This simple, effective trick could have been explained in two paragraphs rather than a 37 page patent document.—GLA

7,898,159
43.38.Ar COMPLIANT ELECTROACTIVE POLYMER TRANSDUCERS FOR SONIC APPLICATIONS

Richard P. Heydt et al., assignors to SRI International
1 March 2011 (Class 310/800); filed 22 September 2009

This patent discloses many of the tricks associated with the use of electroactive polymers as transducers for sound. Although these materials have been discussed for years, they have yet to really appear in market applications due to their finicky behavior and mysterious methods of preparation. The discussion here clears up some of the mystery surrounding the preparation of actuator devices, and shows a few ways in which a serviceable speaker can be made from them. Nevertheless, speakers are not really the application needing this technology; it seems they would be better if put to use as actuators for robotic or artificial limbs, or other interfaces to living tissue. This utilizes their chief virtues of large strain capability and low mechanical impedance, and also their capability to handle impact loads without disintegration or failure. An interesting read for those who would like to get started using them.—JAH

7,860,265
43.38.Dv DIAPHRAGM FOR FULL RANGE BOXLESS ROTARY LOUDSPEAKER DRIVER

John Joseph Gaudreault, Omaha, Nebraska
28 December 2010 (Class 381/423); filed 30 July 2007

Rotary diaphragm 14A supported by bearings 12, 18. The cross section of the diaphragm is an equilateral polygon with at least three sides. One embodiment uses a rotary voice coil swing arm actuator 16 as the