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- (71) Applicant (for all designated States except US): **AMERICAN SCIENCE AND ENGINEERING, INC.** [US/US];
829 Middlesex Turnpike, Billerica, MA 01821 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **ROTHSCHILD, Peter** [US/US]; 540 Lowell Avenue, Newton, MA 02460 (US). **ZHANG, Ming** [US/US]; 292 Concord Road, Wayland, MA 01778 (US).
- (74) Agents: **SUNSTEIN, Bruce, D.** et al.; Sunstein Kann Murphy & Timbers LLP, 125 Summer Street, Boston, MA 02110 (US).
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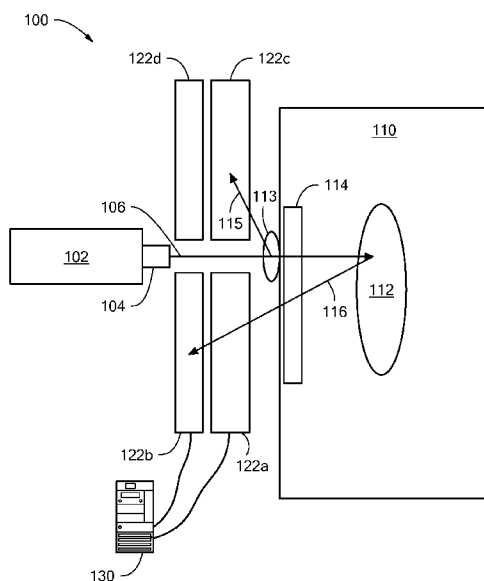


FIG. 1

(57) Abstract: A system and methods for characterizing regions within, or on, an inspected object, wherein a lower-Z scattering material and a higher-Z material both lie along a common line of sight. The inspected object is scanned with penetrating radiation characterized by an energy distribution, and penetrating radiation scattered by the inspected object is detected in a manner that generates a first detector signal that distinguishes between materials of higher and lower effective atomic number under a first set of conditions with respect to the energy distribution of the penetrating radiation and a second detector signal that distinguishes between materials of higher and lower effective atomic number under a second set of conditions with respect to the energy distribution of the penetrating radiation. An image is generated, based on a function of the first detector signal and the second detector signal, while the first and the second detector signals are also combined to create a differential image, so as to allow distinction of higher-Z and lower-Z materials.