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(71) Applicant: INNOVATIVE LASERS CORPORATION [US/US]; Suite 120, 3280 East Hemisphere Loop, Tucson, AZ 85706 (US).

(72) Inventors: ATKINSON, George, H.; 13630 Sahuaro Street, Tucson, AZ 85749 (US). MEHDIZADEH, Esmail; 8040 East El Toro Circle #314, Tucson, AZ 85715 (US). KALISKY, Yehoshua; P.O. Box 9001, 84190 Beer-Sheva (IL). ZHANG, Jiamin; 1715 Pheasant Hollow Drive, Plainsboro, NJ 08536 (US). HINEMAN, Max; Apartment 203, 1680 North Phillippi, Boise, ID 83706 (US). WOLPERDINGER, Markus; 205 North Wilmot Road #307, Tucson, AZ 85711 (US).

(74) Agent: COLLINS, David, W.; Benman Collins & Sawyer, 711 West Los Altos Road, Tucson, AZ 85704 (US).

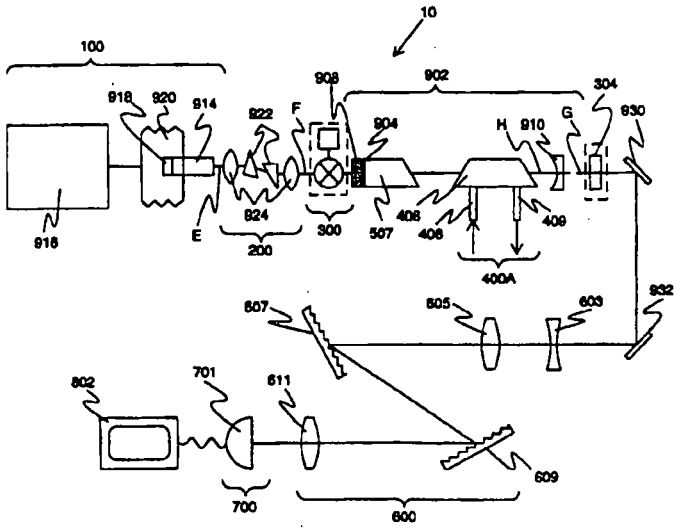
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(54) Title: DIODE LASER-PUMPED AND LINEAR CAVITY SYSTEMS FOR GAS DETECTION VIA INTRACAVITY LASER SPECTROSCOPY



(57) Abstract

Contaminants are detected at concentrations below 1 part-per-million and extending to a level approaching 1 part-per-trillion by using intracavity laser spectroscopy (ILS) techniques. An optically-pumped solid-state (ILS laser) (500) is employed as a detector. The ILS laser (500) comprises an ion-doped crystal (507) in a laser cavity (902) optically pumped by a pumping source (100). A gas sample containing gaseous contaminant species is placed inside the laser cavity (902) on one side of crystal (507). The ILS laser output signal is detected and analyzed to identify the gaseous species (via its spectral signature). Gaseous species concentration can also be determined from the spectral signature. In one embodiment, the ILS laser (500) comprises an ion-doped crystal medium (507) which is pumped by a semiconductor diode laser. In another embodiment, the ILS laser (500) comprises an ion-doped crystal medium (507) in a linear cavity (902).

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