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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). 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). MEHDIZADEH, Esmail; 8040 East El Toro Circle #314, Tucson, AZ 85715 (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).

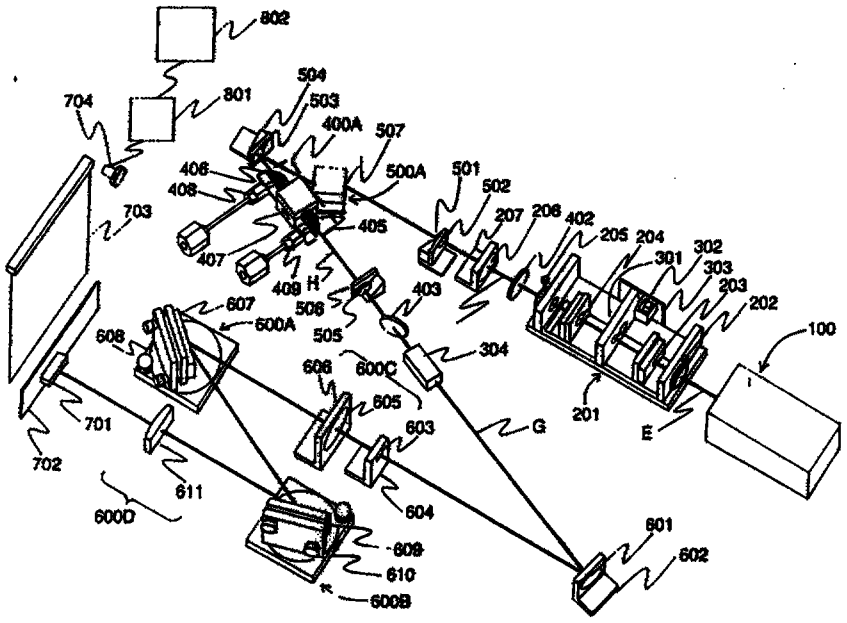
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This Sheet Has Been Replaced

(54) Title: ULTRA-SENSITIVE DETECTION OF CONTAMINANTS IN GAS VIA INTRACAVITY LASER SPECTROSCOPY (ILS)



(57) Abstract

Contaminants in gases such as corrosives are detected optically at concentrations below 1 part-per-million (ppm) and extending to a level below 1 part-per-trillion (ppb) by using intracavity laser spectroscopy (ILS) techniques. A laser (500), the ILS laser (500), is employed as a detector (10). The ILS laser (500) comprises a gain medium (507) contained in a laser cavity (5). A gas sample containing gaseous contaminant species is contained within a gas sample cell (406) which is placed inside the laser cavity (5) and on one side of the gain medium (406). In the case where gaseous species are to be detected in corrosive gas, the corrosive gas is prevented from reacting with the components of the ILS laser (500). The output signal from the ILS laser (500) is detected and analyzed to identify the gaseous species (via its spectral signature). The concentration of the gaseous species can be determined from the spectral signature as well.