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(54) **NEAR-INFRARED SUPER-CONTINUUM LASERS FOR EARLY DETECTION OF BREAST AND OTHER CANCERS**

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(57) **ABSTRACT**

A system and method for using near-infrared or short-wave infrared (SWIR) light sources for early detection and monitoring of breast cancer, as well as other kinds of cancers may detect decreases in lipid content and increases in collagen content, possibly with a shift in the collagen peak wavelengths and changes in spectral features associated with hemoglobin and water content as well. Wavelength ranges between 1000-1400 nm and 1600-1800 nm may permit relatively high penetration depths because they fall within local minima of water absorption, scattering loss decreases with increasing wavelength, and they have characteristic signatures corresponding to overtone and combination bands from chemical bonds of interest, such as hydrocarbons. Broadband light sources and detectors permit spectroscopy in transmission, reflection, and/or diffuse optical tomography. High signal-to-noise ratio may be achieved using a fiber-based super-continuum light source. Risk of pain or skin damage may be mitigated using surface cooling and focused infrared light.

FIG. 1

FIG. 2

THE BREAST: CROSS-SECTION
SCHEME OF THE MAMMARY GLAND.
1. CHEST WALL
2. PECTORALIS MUSCLES
3. LOBULES
4. NIPPLE
5. AREOLA
6. MILK DUCT
7. FATTY TISSUE
8. SKIN

FIG. 3

FIG. 4

DOCKET ALARM
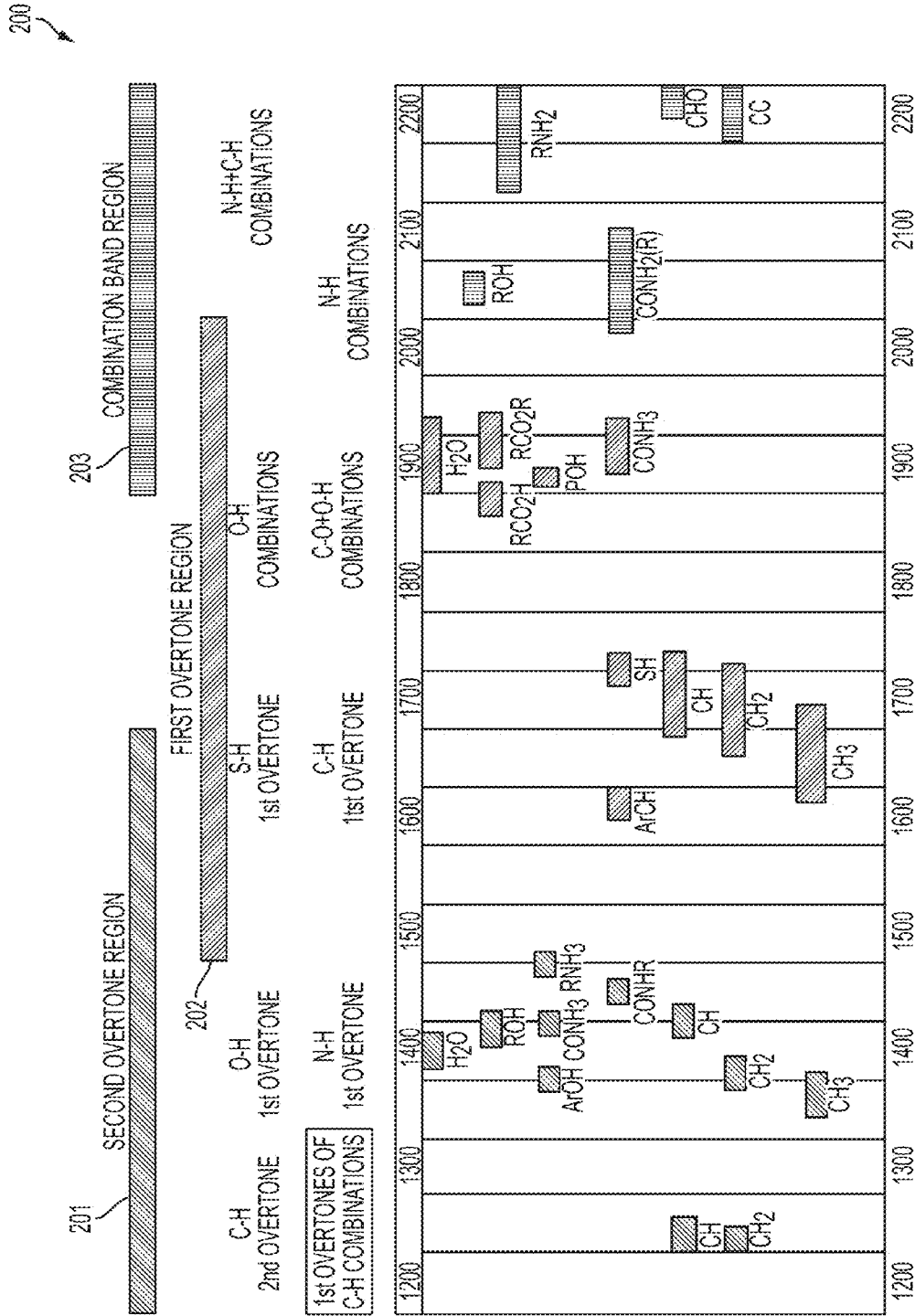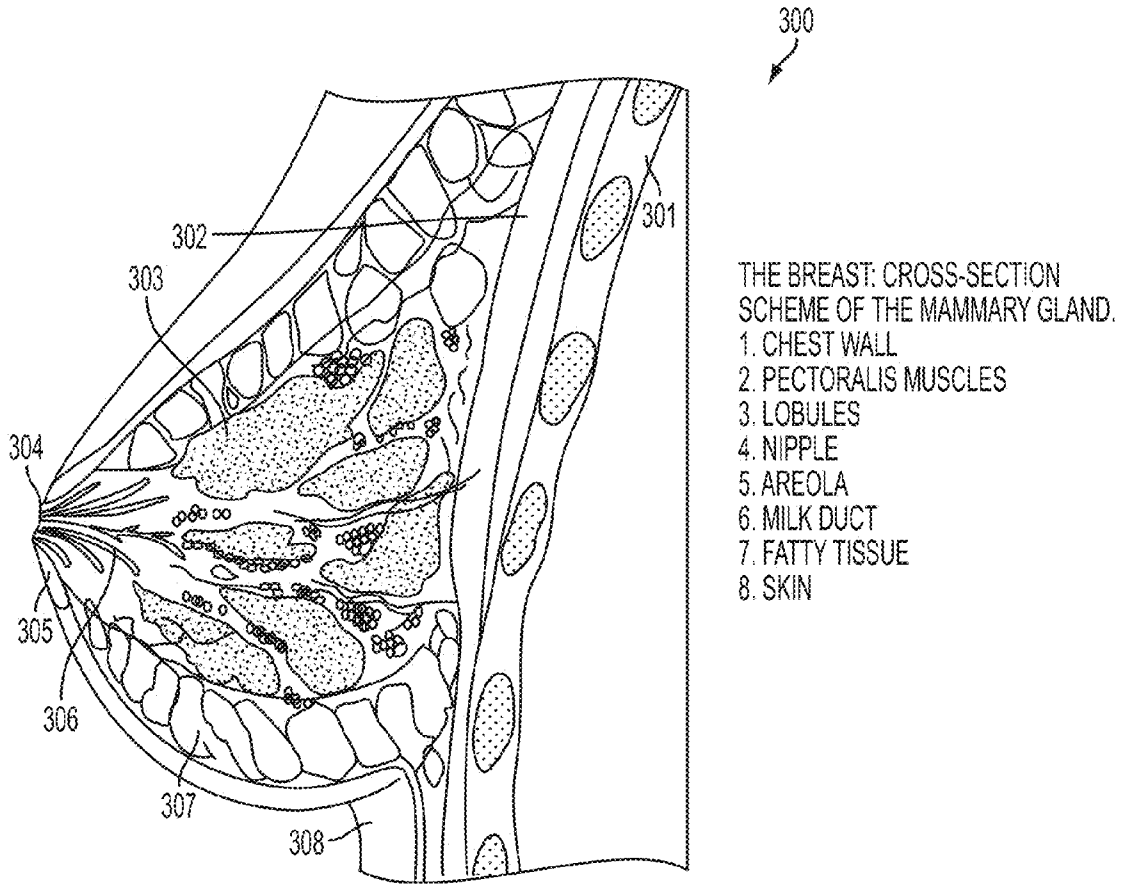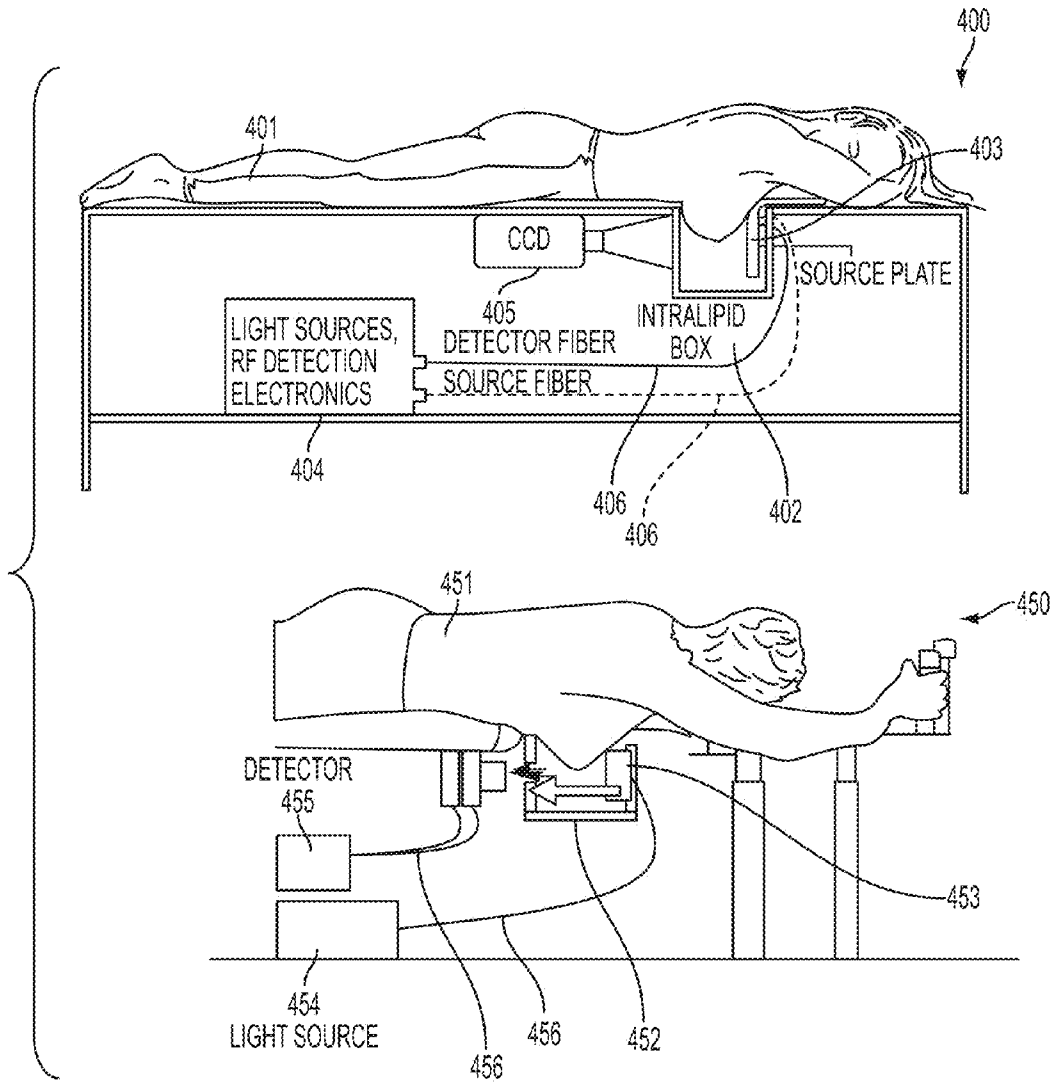
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