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Solarz

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(54) **COHERENT DUV ILLUMINATION FOR SEMICONDUCTOR WAFER INSPECTION**

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(51) **Int. Cl.**
G02B 6/02 (2006.01)

(52) **U.S. Cl.** **385/125**; 385/122; 385/123; 385/126; 359/285; 359/342; 359/334

(58) **Field of Classification Search** 385/125–126, 385/123; 356/369; 372/3, 18; 362/551–582, 362/608–634

See application file for complete search history.

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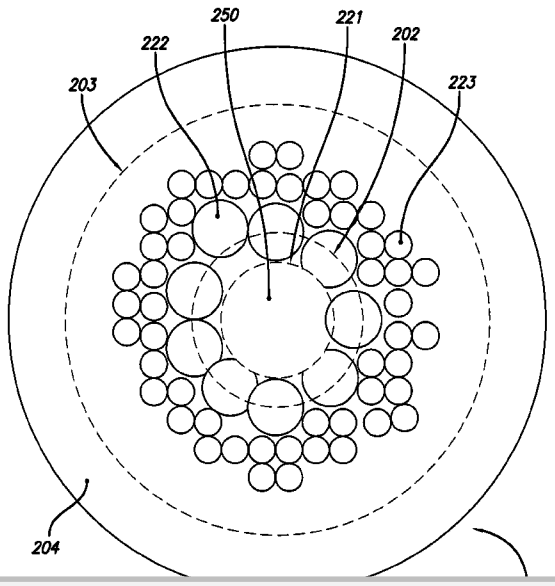
(57) **ABSTRACT**

An apparatus for inspecting a specimen, such as a semiconductor wafer, is provided. The apparatus comprises a laser energy source, such as a deep ultraviolet (DUV) energy source and an optical fiber arrangement. The optical fiber arrangement comprises a core surrounded by a plurality of optical fibers structures used to frequency broaden energy received from the laser energy source into frequency broadened radiation. The frequency broadened radiation is employed as an illumination source for inspecting the specimen. In one aspect, the apparatus comprises a central core and a plurality of structures generally surrounding the central core, the plurality of fibers surround a hollow core fiber filled with a gas at high pressure, a tapered photonic fiber, and/or a spider web photonic crystalline fiber, configured to receive light energy and produce frequency broadened radiation for inspecting the specimen.

24 Claims, 4 Drawing Sheets



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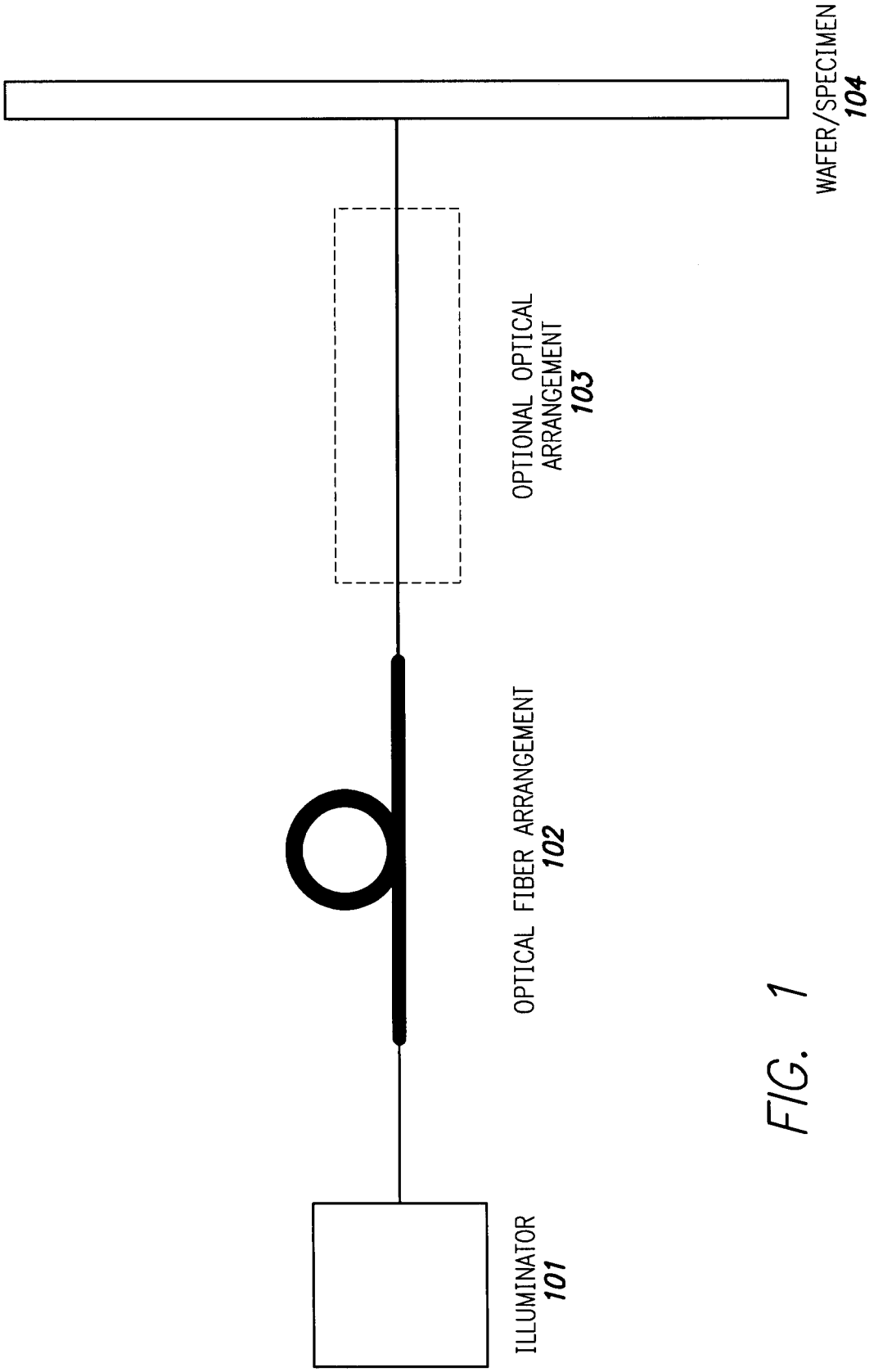

FIG. 1

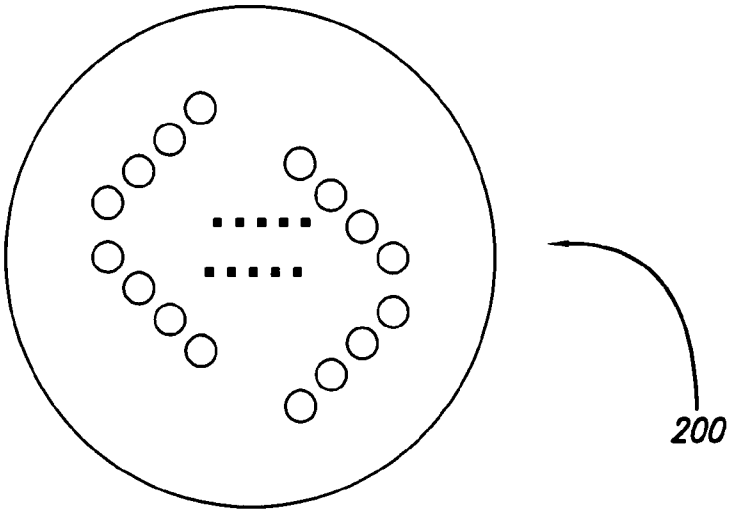

FIG. 2A

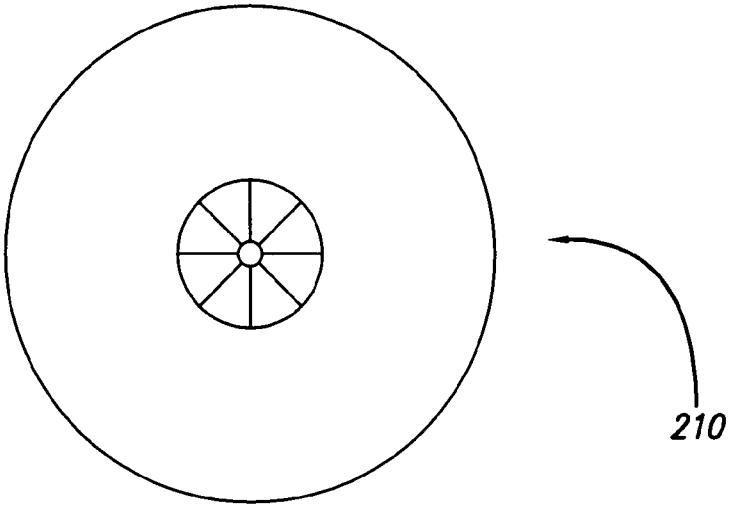

FIG. 2B

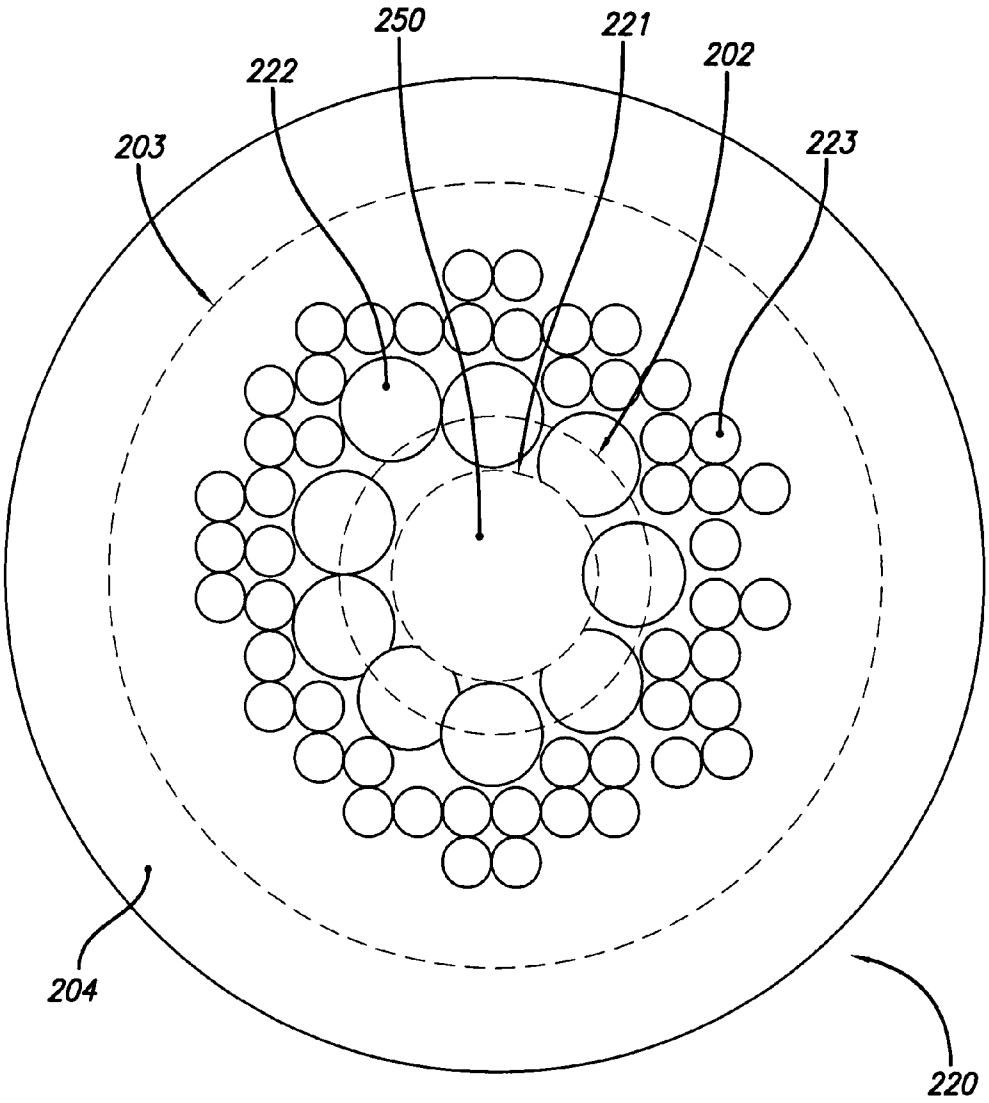

FIG. 2C

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