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(54) Title: METHOD AND SYSTEM FOR DETERMINING AND CONTROLLING THE SEPARATION DISTANCE BETWEEN
A WORKING HEAD OF A LASER PROCESSING MACHINE AND THE SURFACE OF AN OBJECT BEING PROCESSED BY
MEANS OF LOW COHERENCE OPTICAL INTERFEROMETRY TECHNIQUES

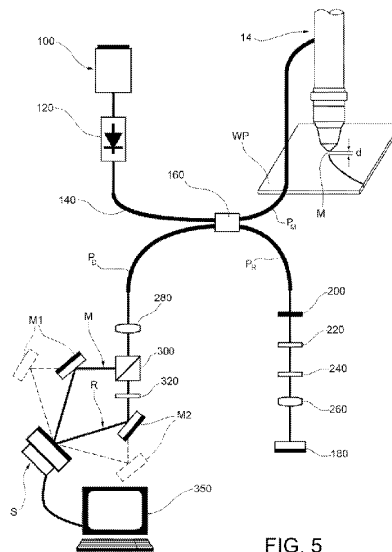


FIG. 5

(57) Abstract: A method and a system are described for determining and controlling the separation distance between a processing head of a machine tool and the surface of a material, comprising: - generating a measurement low coherence optical radiation beam, leading the measurement beam towards the material and leading the reflected or diffused measurement beam from the surface of the material towards an optical interferometric sensor arrangement in a first direction of incidence, - generating a reference low coherence optical radiation beam, and leading the reference beam towards the optical interferometric sensor arrangement in a second direction of incidence at a preset angle of incidence with respect to the first direction of incidence of the measurement beam; - superimposing the

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measurement beam and the reference beam on a common region of incidence of the sensor arrangement; - detecting the position of a pattern of interference fringes between the measurement beam and the reference beam on the region of incidence; and - determining a difference in optical length between the measurement optical path and the reference optical path on the basis of the position of the pattern of interference fringes along an illumination axis of the region of incidence, which is indicative of a difference between (a) the current separation distance between the working head and the surface of the material and (b) a predetermined nominal separation distance.