

Title (en)

Lapping apparatus and method for high speed lapping with a rotatable abrasive platen

Title (de)

Läppvorrichtung und Verfahren zum Hochgeschwindigkeitsläppen mit einer drehbare Schleifplatte

Title (fr)

Procédé et dispositif de polissage pour le polissage à grande vitesse avec un plateau abrasif rotatif

Publication

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Application

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Abstract (en)

Lapping or polishing at high speeds with fine abrasive particles offer significant advantages in the speed of lapping, savings of time in lapping, and smoothness in the finished articles. An improved lapping system comprises a lapper platen system comprising: a) a frame (e.g., having a total weight of at least 200 kg) supporting a work piece holder b) a rotatable platen having an abrasive surface comprising an abrasive sheet secured to said platen, said platen being capable of providing surface feet per minute speeds on its outer edge of at least about 1,500 surface feet per minute; and c) a work piece holder which is movable on said frame. There optionally may be d) a means for introducing a first amount of liquid onto said abrasive surface of said platen at a location before contact between a work piece held on said work piece holder and said abrasive surface on said platen; e) a means for introducing a second amount of liquid onto said abrasive surface of said platen after contact between said work piece and said abrasive surface; and f) means for directing air against said abrasive surface after introduction of said second amount of liquid. The process of the present invention may also be described as: a) providing a work piece to be lapped, having at least one surface to be lapped which can be adjusted to a position parallel to said at least one surface of a rotating platen, b) providing a rotating platen having i) a back surface, ii) a front surface, and a periphery, c) providing a sheet of abrasive material having an abrasive face and a back side onto said rotating platen, with the abrasive face of said sheet facing said at least one surface to be lapped, d) securing said sheet of abrasive material to said front surface of said rotating platen, e) rotating said rotating platen at a rotational speed of at least 500 revolutions per minute, and f) contacting said abrasive face and said at least one surface to be lapped on said work piece. Optionally, one may provide a first amount of liquid to assist lapping to said abrasive surface physically in front of an area where work piece contacts said abrasive face, then provide a second amount of liquid to assist in washing solid material from said abrasive surface physically after said area, and then direct air against said abrasive surface physically after providing said second amount of liquid to assist in removing said first and second amounts of liquid from said abrasive surface. Rotating said platen at a high rotational velocity generates a surface speed of at least 4,000 surface feet per minute (or even more than 20,000 surface feet per minute). The boundary layer of any liquid (e.g., coolant or lubricant) applied to the working surface of the abrasive sheet is controlled by the apparatus and methods of the invention to improve the uniformity of the lapped surface. The use of an annular sheet of abrasive material on the platen offers unique benefits. <IMAGE>

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Cited by

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