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(21) International Application Number: PCT/US96/01512 (22) International Filing Date: 5 February 1996 (05.02.96) (30) Priority Data: 08/411,031 27 March 1995 (27.03.95) US (71) Applicant: KENNAMETAL INC. [US/US]; P.O. Box 231, Latrobe, PA 15650 (US). (72) Inventors: VOGEL, Scott, W.; 5612 Millrace Trail, Raleigh, NC 27606 (US). SHOMAKER, Robert, L.; 8 Cherry Crest Cove, Little Rock, AR 72211 (US). (74) Agents: PORCELLI, James, G. et al.; Kennametal Inc., P.O. Box 231, Latrobe, PA 15650 (US).	(81) Designated States: AU, BR, CA, CN, JP, KR, MX, RU, SG, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>	

(54) Title: **INSERT FOR BALL NOSE END MILL**

(57) Abstract

An insert for use in a ball nose end mill (1) is provided that includes an insert body (22) having a top wall (24), a bottom wall (28) and at least one arcuate side wall (30). An arcuate cutting edge (34) is defined at an intersection between the top and side walls that includes a plurality of sinusoidal undulations (36) for reducing cutting forces, and vibration, and enhancing the breaking and removal of chips removed from a workpiece (66) during a cutting operation. An end portion (67) of the insert crosses the axis of rotation (A) when the insert is mounted in the seat of an end mill body (3), and the undulations (36) reduce the considerable shear forces applied to the cutting edge (34) at this location. The cutting edge has a profile which follows the contour of a sphere to permit machining a rounded cut. The side wall (30) of the insert body includes an upper relief portion (44) disposed directly under the cutting edge, with a relief angle for preventing the undulations from making unwanted striations or tool marks in the sidewalls of the rounded cut.

