

9706360-6  
1PDS

PCT

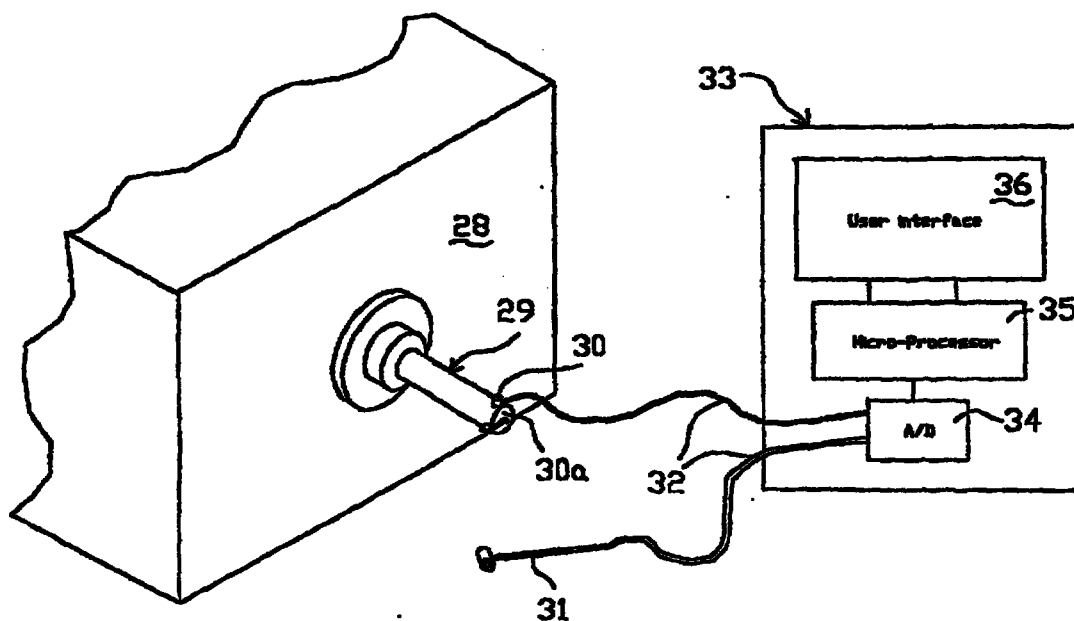
WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                     |                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| (51) International Patent Classification <sup>6</sup> :<br>B23Q 11/00, B23B 29/02                                                                                                                                                                                                                                                                                                                                                                                                               | A1                                                                                                                                                                                                  | (11) International Publication Number: WO 96/37338<br>(43) International Publication Date: 28 November 1996 (28.11.96) |
| (21) International Application Number: PCT/US96/07151<br>(22) International Filing Date: 17 May 1996 (17.05.96)<br>(30) Priority Data: 08/447,939 23 May 1995 (23.05.95) US<br>(71) Applicant: DESIGN & MANUFACTURING SOLUTIONS, INC. [US/US]; 6129 Savoy Circle, Lutz, FL 33549 (US).<br>(72) Inventor: COBB, William, T., Jr.; 11901 - 4th Street, N. #715, St. Petersburg, FL 33716 (US).<br>(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, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).<br>Published<br>With international search report. |                                                                                                                        |

(54) Title: TUNED DAMPING SYSTEM FOR SUPPRESSING VIBRATIONS DURING MACHINING



(57) Abstract

Disclosed is a tunable damping system (26) for use in reducing vibrations associated with metal cutting and tooling. The tunable damping system (26) may be located in a boring bar, an end mill, a modular tool section or the spindle/tool holder of the metal cutting machine. The tunable damping system incorporates a damper mass (9), elastomeric supports (10a, 10b), and a means (13, 15) to lock the mass so as to determine tuning parameters. A tuner assembly (1) consists of sensors (30, 31) and a microprocessor (35) capable of recognizing the most dynamically flexible mode of vibration. The tuner assembly (1) is also capable, through signal processing and microprocessor controlled algorithms, to direct the operator in implementing the proper tuning adjustments of the tunable damping system (26).