

Title (en)

ULTRASONIC IMPACT MACHINING OF BODY SURFACES TO CORRECT DEFECTS AND STRENGTHEN WORK SURFACES

Title (de)

ULTRASCHALLKALTSCHLAGSCHMIEDEN VON KÖRPEROBERFLÄCHEN ZUR KORREKTUR VON MÄNGELN UND FESTIGUNG VON ARBEITSOBERFLÄCHEN

Title (fr)

USINAGE A IMPACTS ULTRASONIQUES DE SURFACES DE CORPS POUR CORRIGER DES DEFAUTS ET RENFORCER DES SURFACES A USINER

Publication

**EP 1552028 A1 20050713 (EN)**

Application

**EP 03766806 A 20030417**

Priority

- US 0311791 W 20030417
- US 20785902 A 20020731

Abstract (en)

[origin: WO2004013359A1] Metallic workpieces of diverse shapes having work surfaces (13) which are deformed at the surface and adjacent sub-surface layers by surface impact from ultrasonic transducers (11) employing freely axially moving impacting elements (12) propelled and energized by a transducer oscillating surface vibrating periodically (10) at an ultrasonic frequency (14). The impacting elements are propelled in a random aperiodic and controlled impact mode at different phases of the periodic oscillation cycles. The transducer may be portable and provides a series of mechanically interconnected stages having mechanical resonances harmonically related as a multiple of the primary ultrasonic frequency and have matched stage resistances under instantaneous loading when the impact elements are driven by the transducer oscillating surface into the surface of the workpiece. This mode of operation produces Q-factor amplification of the input ultrasonic power oscillator energy at the impact needles and high propulsion velocities making it possible to machine metallic workpiece bodies to greater depths for compressing the metal to increase compressive strength of the work surfaces and ultimate material strength of the workpiece. The machining is done at ambient temperatures.

IPC 1-7

**C21D 10/00**; **B21J 7/20**

IPC 8 full level

**C21D 10/00** (2006.01); **B21J 7/20** (2006.01); **C21D 7/04** (2006.01)

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