

LASER SHOCK PEENED GAS TURBINE ENGINE SEAL TEETH

ABSTRACT

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The present invention includes a method of repairing an annular metallic article (10) and the repaired article itself which has an axially extending annular support (14) and a projection (12) generally radially extending therefrom. The projection (12) has an associated operating radial height (H) as measured from a radially facing annular first surface (18) of the support and an associated shape (S). An upper portion (20) of the projection (12) is removed forming a stub (22) extending away from the first surface (18) and having a bonding surface (24) at a stub end (26) spaced apart from the first surface (18). A metallic material (28) is metallurgically bonded to the bonding surface (24) forming an annular heat affected zone (30) in the stub (22) bounded by the bonding surface (24). A first portion (32) of the metallic material (28) is removed to restore the projection (12) to the operating height (H) and shape (S). At least one annular outer surface of the tooth extending over at least a portion of the heat affected zone (30) is laser shock peened, preferably after the first portion (32) of the metallic material (28) is removed. A tip (34) of the stub (22) formed by the removing of the first portion (32) of the metallic material (28) may also be laser shock peened as may a non-heat affected zone portion (44) of the stub (22) extending at least a partial length (P) of a distance (D1) from the heat affected zone (30) to the first surface (18). Opposite forward and aft facing annular surfaces (S1, S2) of the projection (12) may be laser shock peened, preferably simultaneously. The laser beam (102) may be fired normal to or at an oblique angle to the forward and aft facing annular surfaces (S1, S2).

Figure 4



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