

Title (en)

Q-SWITCHED CO₂LASER MATERIAL MACHINING SYSTEM COMPRISING ACOUSTO-OPTIC MODULATORS

Title (de)

GÜTEGESCHALTETES CO₂-LASER-MATERIALBEARBEITUNGSSYSTEM MIT AKUSTOOPTISCHEN MODULATOREN

Title (fr)

SYSTÈME DE TRAITEMENT DE MATÉRIAUX PAR LASER À CO₂ DÉCLENCHÉ AVEC MODULATEURS ACOUSTO-OPTIQUES

Publication

EP 3195430 A1 20170726 (DE)

Application

EP 15787282 A 20150722

Priority

- DE 102014013567 A 20140918
- IB 2015001649 W 20150722

Abstract (en)

[origin: WO2016042387A1] The invention relates to a Q-switched CO₂laser material machining system comprising acousto-optic modulators (AOM) which are used inside the resonator for Q-switching the CO₂ laser as well as externally for extremely efficiently suppressing radiation feedback between the laser and the workpiece. The essential idea is to specifically take into account the frequency shift of the radiation which is diffracted on the AOM and corresponds exactly to the exciting frequency of the acoustic wave in the AOM crystal, in order to amplify radiation in the active medium. Since said frequency shift significantly reduces the amplification of the radiation, same has to be prevented during the Q-switching process; for this purpose, according to the invention, two AOMs are used which have the same exciting frequency but propagate the acoustic waves in opposite directions in the crystal. In contrast thereto, the frequency shift has an advantageous effect on the suppression of radiation feedback between the laser and the workpiece if, according to the invention, an AOM is placed between the laser output and the workpiece, said AOM having a specific minimum exciting frequency for the acoustic wave such that the wave propagating back into the laser undergoes virtually no amplification by the active medium when the beam diffracted on the AOM is used as the working beam.

IPC 8 full level

H01S 3/127 (2006.01); **H01S 3/00** (2006.01); **H01S 3/117** (2006.01); **H01S 3/223** (2006.01)

CPC (source: CN EP KR US)

G02B 27/0966 (2013.01 - US); **H01S 3/005** (2013.01 - US); **H01S 3/0064** (2013.01 - CN EP KR US); **H01S 3/0071** (2013.01 - CN KR); **H01S 3/10** (2013.01 - US); **H01S 3/117** (2013.01 - CN EP KR US); **H01S 3/127** (2013.01 - CN EP KR US); **H01S 3/2232** (2013.01 - CN EP KR US); **H01S 3/0071** (2013.01 - EP US)

Citation (search report)

See references of WO 2016042387A1

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

DE 102014013567 B3 20151008; CN 107005019 A 20170801; EP 3195430 A1 20170726; JP 2017535063 A 20171124; KR 20170056633 A 20170523; US 10224689 B2 20190305; US 2017310070 A1 20171026; WO 2016042387 A1 20160324

DOCDB simple family (application)

DE 102014013567 A 20140918; CN 201580050601 A 20150722; EP 15787282 A 20150722; IB 2015001649 W 20150722; JP 2017512837 A 20150722; KR 20177010089 A 20150722; US 201515512607 A 20150722