

Title (en)

Fixture for hardening a ring shaped workpiece

Title (de)

Fixtur zum Härten eines einzelnen ringförmigen Werkstücks

Title (fr)

Système de fixation pour le durcissement d'une pièce en forme d'anneau

Publication

EP 2700725 B1 20191106 (DE)

Application

EP 13004141 A 20130822

Priority

DE 102012016603 A 20120823

Abstract (en)

[origin: EP2700725A2] The fixture comprises a mandrel (1) disposed in the fixture, a force-pressurization device, conductive paths for supplying cold gaseous quenching agent to an annular workpiece (3) and for discharging heated quenching agent from the fixture, and radially outwardly directed nozzles. The mandrel is coaxially positioned to a rotational axis of the workpiece, and extends by its internal opening during hardening of the workpiece. The force-pressurization device comprises a support (2), and is mechanically movable along an axis of rotation of a blank holder. The fixture comprises a mandrel (1) disposed in the fixture, a force-pressurization device, conductive paths for supplying cold gaseous quenching agent to an annular workpiece (3) and for discharging heated quenching agent from the fixture, and radially outwardly directed nozzles. The mandrel is coaxially positioned to a rotational axis of the workpiece, and extends by its internal opening during hardening of the workpiece. The force-pressurization device comprises a support (2), and is mechanically movable along an axis of rotation of a blank holder. During hardening of the workpiece, a first end face (5) of the workpiece on the support rests, and a second end face of the workpiece opposing the first end face rests at the holder using force. The conductive paths define mutually opposing surfaces of the workpiece, and are partially formed inside of the mandrel. During supplying, the nozzles are arranged within the mandrel and configured for direct flow onto the radially inwardly facing inner surfaces of the workpiece with the gaseous quenching agent or the nozzles are formed in the support and the blank holder to direct flow onto the axially facing outer surfaces of the workpiece. The inner surface of the workpiece defines an inner opening in the workpiece, and is formed in the outer surface of the workpiece. The conductive paths are attached to the nozzles around in the direction of the workpiece. The nozzles are connected to conductive paths for supplying the liquid quenching agent and the receiving drops of the liquid quenching agent to the gaseous quenching agent, and are designed as a carrier medium. The fixture further comprises a temperature sensor for detecting temperature disposed on the workpiece, and a control and/or regulating device that is connected to the temperature sensor for adjusting the supply of quenching agent based on the temperature on the workpiece. An independent claim is included for a method for hardening a single annular workpiece.

IPC 8 full level

C21D 9/40 (2006.01); **C21D 1/673** (2006.01)

CPC (source: EP)

C21D 1/673 (2013.01); **C21D 9/40** (2013.01)

Cited by

DE102019006203A1; DE102019006202A1; CN109321725A; DE102019006201A1; WO2020225182A1; WO2020225103A1

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

DOCDB simple family (publication)

DE 102012016603 B3 20131224; EP 2700725 A2 20140226; EP 2700725 A3 20150304; EP 2700725 B1 20191106; PL 2700725 T3 20200713

DOCDB simple family (application)

DE 102012016603 A 20120823; EP 13004141 A 20130822; PL 13004141 T 20130822