Patent Search

Invention Title	A DEVICE AND A METHOD FOR EXECUTING THE DRY AND CRYOGENIC BASED FRICTION STIR WELDING (FSW) OF THE NON-FERROUS MI
Publication Number	25/2021
Publication Date	18/06/2021
Publication Type	INA
Application Number	202141020606
Application Filing Date	06/05/2021
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	MECHANICAL ENGINEERING
Classification (IPC)	B23K0020120000, F25D0003100000, B29K0027060000, C21D0001613000, B23K0020227000

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Abstract:

ABSTRACT A device for executing the liquid nitrogen based cryogenic aided friction stir welding of the metal alloy based workpiece comprises a single body FSW with motor (A) connected to a driving gear convertor (B) for directional conversion " of the angle of rotation; a fixture assembly (C) fixedly affixed on the tail stock (D) for ho least two work piece; at least two work pieces (F) being friction stir welded by the friction created during the rotational movement assisted by the perpendicular alignı at least three tool profile (G); a thermocouple (H) in contact with the work pieces (F) and a thermocouple data acquisition system (E) positioned vertically below the tai coordinate with the said welding process in monitoring and maintaining the preset temperature around the weld region and a cryogenic assembly including the liquic storage container made of aluminium and steel with a compressor, pressure regulator and pressure • relief valves and the corresponding passages including the pne stainless steel pipes and braided stainless steel hose for directing the sub-zero liquid nitrogen at the region of weld. Further the said device executes a method of liqu based cryogenic aided friction stir welding of the metal alloy based workpiece involving the steps of selecting the at least three profiles of tools including the involute type and thread profile; identifying the work piece of AA7075 aluminium alloy comprising zinc as the alloying element; aligning the said at least two work piece of AA7 aluminium alloy sandwiched between the mandrel, plate and holders through the mechanical locking means and initiating the rotational process at a controlled spee directional movement against each other work piece for introducing the frictional energy in the weld forming region; supplying the cryogenic based liquid nitrogen fr made set up onto the stir friction welded interface region of the said two work piece and finally performing an onward machining by rotating both the work pieces an the rotating element amidst the supply of the cryogenic liquid nitrogen at the region of weld and advancing the work pieces along a path in nitrogen atmosphere whe friction weld is to be formed, the element having a pre-defined geometry. FIG.1

Complete Specification

I Claim

1) A method for executing the liquid nitrogen based cryogenic aided friction stir welding of the metal alloy based workpiece comprises the steps of

i) Selecting the at least three profiles of tools including the involute profile, step type and thread profile;

ii) Identifying the work piece of AA7075 aluminium alloy comprising zinc as the alloying element;

iii) Aligning the said at least two work piece of AA7075 aluminium alloy sandwiched between the mandrel, plate and holders through the mechanical locking means initiating the rotational process at a controlled speed for the directional movement against each other work piece for introducing the frictional energy in the weld fc region;

iv) Supplying the cryogenic based liquid nitrogen from the tailor made set up onto the stir friction welded interface region of the said two work piece;

v) Performing an onward machining by rotating both the work pieces and directing the rotating element amidst the supply of the cryogenic liquid nitrogen at the re weld and advancing the work pieces along a path in nitrogen atmosphere where a stir friction weld is to be formed, the element having a pre-defined geometry.

2) The method for executing the liquid nitrogen based cryogenic aided friction stir welding of the metal alloy based workpiece as claimed in claim 1 wherein the sai friction welding includes cryogenic and dry welding for establishing a welded joint of the non-ferrous alloys of aluminium, magnesium and copper.

3) The method for executing the liquid nitrogen based cryogenic aided friction stir welding of the metal alloy based workpiece as claimed in claim 1 wherein the sai pin profile rotates between the work pieces for generating the requisite friction heat.

4) The method for executing the liquid nitrogen based cryogenic aided friction stir welding of the metal alloy based workpiece as claimed in claim 1 wherein the sai

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