

Title (en)

Method of producing a metallic composite body and composite body

Title (de)

Verfahren zur Herstellung eines Verbundkörpers und Verbundkörper

Title (fr)

Procédé de production d'un corps composite métallique et corps composite

Publication

EP 0960959 A1 19991201 (DE)

Application

EP 98120653 A 19981104

Priority

DE 19823728 A 19980527

Abstract (en)

The inner surface (13) of a rotationally symmetric metal support element (12) is provided at least partially with a diffusion blocking layer which in turn is provided with a layer of molten nonferrous metal. During cooling and solidification the latter is let to shrink without restrictions. After solidification this layer is subjected to plastic deformation to bring it into a close contact with the inner layer (13) of the support element (12). The produced component, in particular, has a steel support element (12) with grooves (14) nonferrous metal (in particular, aluminum or copper) fillings. The inner surface (including the groove walls and an annular end region) of the support element are provided at least partially a non flaking, firmly adhering and non reducible diffusion blocking layer. The diffusion blocking layer carries a plastically deformed nonferrous metal layer forming an electrically and thermally conductive connection between the filled grooves (14) and the contact surface of the nonferrous metal layer. Preferred Features: The inner surface (13) of the support element (12) with grooves (14) is provided with a layer of nonferrous metal in such a way that the grooves are filled out and a closed annular surface is formed by the nonferrous metal at least in one inner surface region of the support element. The steel support element consists of either a single piece or is made up of several constituent parts. Aluminum, copper or alloys are preferably used as a nonferrous metal. The non flaking, firmly adhering non reducible diffusion blocking layer is an oxide layer produced by heating of the support element. Alternatively it is produced by phosphating, chromating, boronizing, nitrating, galvanic coating, or by physical or chemical vapor-phase precipitation. The nonferrous molten metal layer is produced by a centrifugal process whose flow rate is governed by a mathematical expression involving the length and diameter of the support element and the layer thickness. The molten nonferrous metal used contains deoxidization agents which prevent skin formation and do not attack the diffusion blocking layer. Deoxidization agents based on boron/lithium or phosphorus are used. The nonferrous metal layer is applied with a surplus which subsequently is removed, in particular, by turning. The thickness of the remaining layer varies, in particular, from 3 mm to 20 mm. The support element is rotated during cooling and solidification of the nonferrous metal layer. Plastic deformation of the applied layer takes place by rolling or by means of a mechanical expander, in particular, an upsetting press.

Abstract (de)

Die Erfindung betrifft ein Verfahren zur Herstellung eines rotationssymmetrischen, metallischen Verbundkörpers aus einem hohlen, metallischen Stützkörper und einer elektrisch und/oder thermisch leitfähigen Innenschicht aus einem Nichteisen (NE)-Metall, mit den folgenden Merkmale: Die Innenfläche des Stützkörpers wird zumindest teilweise mit einer Diffusions-Sperrschicht versehen; auf der Diffusions-Sperrschicht wird die Innenschicht aus dem schmelzflüssigen NE-Metall erzeugt, die während ihrer Abkühlung und Erstarrung ungehindert schrumpfen kann; und die Innenschicht wird nach der Erstarrung durch eine plastische Verformung in engen Kontakt mit der Innenfläche des Stützkörpers gebracht. Ein weiterer Aspekt der Erfindung betrifft einen solchen Verbundkörper. <IMAGE>

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- [A] US 4799419 A 19890124 - KRAUSE BERND [DE]
- [A] DE 2440850 A1 19760311 - HOHENZOLLERN HUETTENVERWALT
- [A] GB 2117403 A 19831012 - SHELL INT RESEARCH

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