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Selected Patents Related to Thermal Spraying

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AT denotes Austrian patent, CA denotes Canadian patent, DE denotes German patent, EP denotes European patent, GB denotes British patent, JP denotes Japanese patent, RU denotes Russian patent, US denotes United States patent. The information has the following format: Title, Abstract, Patent Number, Inventors, Company, Date of Issue.

Applications

Applying a Protective Coating on a Substrate and Method for Manufacturing the Protective Layer. The substrate, and especially the surface of a turbine or an aero engine, is covered by a protective layer resistant to high temperatures, oxidizing and corrosion. The layer is applied by thermo-chemical deposition and especially an atmospheric plasma spray (APS), using aluminum (Cr,Si), with a specific high aluminum deposition activity. The layer is structured to give increasing alloy gradients from the substrate surface to the outer layer surface together with isolated globular metal oxide particles.

US7422769: Kassner Stefan, Niedermaier Markus, and Pillhoefer Horst. Company: MTU Aero Engines Gmbh. Issued: September 9, 2008.

Bimetal Bore Seal. A bore seal for connecting and sealing oil and gas tubular members is disclosed which has a metal core manufactured from a high yield strength ferrous material and a protective overlay of corrosion and abrasion resistant stainless steel and/or nickel based alloy. The protective overlay is applied to the entire outer surface of the bore seal by a metal thermal spray process, such as plasma thermal spraying. In a preferred embodiment of the invention, the bore seal has a fishtail profile which facilitates the use of resilient seals to provide resistance to external pressures in addition to the traditional metal-to-metal seal between the bore seal and the tubular members. In an alternative embodiment, a pressure relief valve is disposed within the bore seal to verify the integrity of the metal-to-metal seal with respect to internal bore pressure.

GB2441688: Paton Alan Stewart and Roots Philip Stanley. Company: Sub Drill Supply Ltd. Issued: August 13, 2008.

Coatings on Fiber Reinforced Composites. The invention is a coating and a method for applying coatings to fiber reinforced composite materials. A first polymeric layer, free of fibers and particulate, coats a fiber reinforced polymer substrate. The first layer joins the fiber reinforced polymer substrate to a second polymeric layer. The second polymeric layer contains a polymeric matrix and a particulate within the polymeric matrix. Finally, at least one thermally sprayed material coats the second polymeric layer to form an adherent multi-layer coating attached to the fiber reinforced.

US7419704: Passman Richard K. and Mcpherson David A. Company: Praxair Technology Inc. Issued: September 2, 2008.

Component for Rotary Machine and Rotary Machine. A coating layer is provided on a surface of the moving blades of a rotary machine. The coating layer includes a spray layer on the base material of the moving blades and a fluorocarbon resin layer on the spray layer. The spray layer is porous. The fluorocarbon resin layer is made of fluorocarbon resin. The fluorocarbon resin layer also contains an inorganic substance that is exposed on the surface of the fluorocarbon resin layer.

US7410701: Yasui Toyoaki, Yamada Yoshikazu, Hananaka Katsuyasu, Hata Satoshi, Tsurusaki Yuzo, and Isumi Osamu. Company: Mitsubishi Heavy Ind Ltd. Issued: August 12, 2008.

Corrosion-Resistant ABS Tone Ring. A tone ring of a vehicle anti-lock braking system of the type that is integrated into a disc brake rotor. The tone ring has a protective layer which enables it to withstand the combination of extreme heat and harsh environmental conditions to which it is exposed during operation of the vehicle. The protective layer is applied by thermally spraying a selected one of a plurality of materials, such as a nickel-based alloy, a high-chrome stainless steel, or non-ferrous materials such as an aluminum, copper-based alloys or a ceramic, on teeth of the tone ring, and without causing the protective layer to be deposited on the rotor braking surfaces. The protective layer generally prevents the formation of oxidation and corrosion byproduct layers on the teeth, to thereby maintain sensitivity for detection of teeth movement by the anti-lock braking system sensor during operation of the system.

AT398739: Redgrave Chris. Company: Hendrickson Int Corp. Issued: July 15, 2008.

Electric Conducting Coating on Aluminum Bar Anodizes and its Manufactoring Process Associates. The present invention relates to a manufactoring process of an electric coating surface conducting on anodic an aluminum alloy bar which can be used in the electric boxes, characterized in that it includes/understands: a stage of activation of the surface of the bar to be treated by a consistent automated system in a milling or a sandpapering with an abrasive, a stage of realization of a metal, conducting coating electric, using a system of automated linear displacement, by process of projection cold spray, the diameter of the tube of the gun cold spray being adjusted with the desired conducting bandwidth. This process offers in addition to required electric conductibility the advantage of being a clean process from the environmental point of view, easily integrable and not very expensive for the production of great series since the output of projection is high and the process the use of mask or masking for the realization of the electric conducting lines does not require.

FR2900353: Bernard Daniel. Company: Bernard Daniel. Issued: August 29, 2008.

End Face Contact Type Mechanical Seal. Problem to be solved: To provide an end face contact type mechanical seal having a long-time good shaft sealing function in rotary equipment such as a preceding stand-by operation type pump for submerged or aerial operation

while effectively suppressing the heating of sealing rings even in aerial operation. Solution: The end face contact type mechanical seal has the first sealing ring and the second sealing ring relatively rotated in slide contact. The first sealing ring is formed of a self-lubricating material and a ring surface as the end face of the second sealing ring, with which the first sealing ring has slide contact, is formed of a porous film having a porosity of 4-20% which is formed of a material harder than the material for the first sealing ring and whose pores have average diameters of 10-60 μm and communicate with each other. The porous film is a chrome oxide film flame sprayed and a body portion of the second sealing ring excluding the porous film is formed of titanium.

JP4119276: Fukui Toshio and Terakawa Kazuhiro. Company: Nippon Pillar Packing. Issued: July 16, 2008.

Fabrication of a Magnetoelastic Torque Sensor. A method of fabricating a magnetoelastic torque sensor includes plating a magnetoelastic material to a magnetically inert substrate, and its endowment with uniaxial magnetic anisotropy through the creation within the transducer element of stress anisotropy. The plating of magnetostrictive material to the magnetically inert substrate provides a less expensive torque element that exhibits desired levels of accuracy and reliability.

US7401531: Cripe David W. Company: Continental Automotive Systems. Issued: July 22, 2008.

Inner Pot for Induction Heating Rice Cooker. Problem to be solved: To provide an inner pot for induction heating rice cooker, which has improved corrosion resistance property, capable of preventing smell of a food or drink from generating. Solution: The inner pot for induction heating type rice cooker comprises a base container with opening in the top surface, an outer aluminum body molded outside the base container, a stainless steel magnetic film thermally sprayed onto the surface of the external body so as to generate heat by means of magnetic force line of an induced current, and an aluminum cover part thermally sprayed onto the outer surface of the magnetic film.

JP4130212: Kim Won Young and Sung Yu Ho. Company: Cuckoo Electronics Co Ltd. Issued: August 6, 2008.

Interface Treatment between Components for Controlling Long-Term Deformation Properties, Involves Application of Surface Layers, e.g. by Flame Spraying. Two components are in electrical or mechanical contact. The surface flow property of at least one component is modified by applying several layers of different material, e.g. by flame spraying, with a thickness of 10-200 μm. A material of better properties can be applied locally in a limited zone, e.g. for electrical contacts. An independent claim is also included for the process of adjusting the flow properties of contact surfaces in this way. The layers can have recesses or raised portions to inhibit material flow. Depending on the application, plastics, ceramics or metals can be applied by thermal spraying.

DE10222284: Reichinger Gerhard and Goetz Knuth. Company: Leoni AG. Issued: July 3, 2008.

Layer with Gradient and Method for Production Thereof. Hard mechanical coatings applied by thermal spray application onto softer surfaces frequently exhibit insufficient adhesion, so that undesired defoliations occur. It is the task of the present invention to provide a coating with optimal mechanical load bearing capacity and adhesion, as well as a simplified process for production thereof. The task is solved in that a gradient layer is applied by arc wire spraying upon a surface, wherein during the spray application at least one of the process parameters (a) current strength or voltage of the arc or (b) gas pressure of the carrier gas is varied.

DE102004006857: Djahanbakhsh Mohammad, Haug Tilmann, and Lampmann Florian. Company: Daimler Chrysler AG. Issued: September 4, 2008.

Method for Repairing Wall of Coke Oven. Problem to be solved: To provide a method for repairing the wall of a coke oven which can simply and reliably form strong repair mass and can provide an improved repairing efficiency and a reduced repairing cost. Solution: In repairing a damage part on a wall that partitions a chamber-type coke oven into a combustion chamber and a coking chamber, a repairing material is thermally sprayed onto the wall surface facing the damage part from the side of the combustion chamber by means of a thermal spray lance to form a thermally sprayed repair layer spreading to the proximity to the damage part, and a repairing material is thermally sprayed onto and filled into the damage part from the side of the coking chamber.

JP4123975: Shiozawa Toru, Takeshita Masakatsu, and Tanaka Hitoshi. Company: JFE Steel Kk. Issued: July 23, 2008.

Method of Depositing and Using a Composite Coating on Light Metal Substrates. Method of depositing an Fe_xO comprising coating onto a light metal substrate by use of wire-arc thermal spraying that propels atomized droplets by use of atomizing gases, comprising: preparing at least one surface of the light metal substrate to present an exposed essentially non-oxidized substrate surface; and thermally spraying melted droplets of a steel feedstock wire onto the prepared surface by use of propellant gases to deposit a composite coating, the gases being controlled as to content to regulate the exposure of the droplets to oxygen so that Fe_xO is substantially the only iron oxide formed during spraying, x being 0.5-1.5.

CA2186172: Zaluzec Matthew J., Mccune Jr Robert C., Popoola Oludele O., Baughman James R., and Brevick John E. Company: Ford Motor Co. Issued: August 12, 2008.

Method of Forming Metal Foams by Cold Spray Technique. The present invention relates to a method of forming metallic foams using cold spray processing. The method allows for the formation of metallic foams on existing substrates as a layer. The method includes the steps of providing a substrate for coating of a metallic foam; cold spraying a mixture of metal particles and a foaming agent onto the substrate to form a substrate coated with an unexpanded metallic layer; foam heat treating the substrate coated with an unexpanded metallic layer at a temperature above the decomposition temperature of the foaming agent for a time sufficient to form a heated substrate coated with an expanded metal foam layer; and cooling the heated substrate coated with an expanded metal foam layer to about ambient temperature to form a cooled substrate coated with an expanded metal foam layer. The method of forming metallic

foams on substrates finds application in the oil, gas, and chemical industry by being an integral part of casings, pipelines, transfer lines, and other flow lines.

US7402277: Ayer Raghavan and Pokutylowicz Norman. Company: Exxon Mobil Research & Engineering Co. Issued: July 22, 2008.

Methods for Production of FGM Net Shaped Body for Various Applications. Methods for the production of functionally graded material (FGM) are provided. FGM is processed by powder cold spraying ceramic-metal layers, the final shape is pre-pressed by cold isostatic pressing and is then sintered using field activated sintering technique (FAST). The FGM materials can be used for medical applications.

US7393559: Groza Joanna R and Kodash Vladimir. Company: The Regents of the University of California. Issued: July 1, 2008.

Mold for Continuous Casting and Method for Manufacturing and Repairing the Same. Problem to be solved: To provide a mold for continuous casting which is excellent in electric conductivity and thermal conductivity as well as abrasion resistance, has high adhesion and has a long-lived fine coat on its surface; a method for manufacturing the mold for continuous casting efficiently and without any thermal effect on the base material; and a method for repairing the mold for continuous casting which enables the partial repair of a mold which has never been done and can, as a result, attain a reduction in the manufacturing cost of the mold and long life of the mold. Solution: The coat formed on the surface of the mold for continuous casting is made of any one of Cr, Ni and Ni alloy, or a complex of Ni or Ni alloy of 10-90 mass% and the rest of high-hardness ceramics, and 0.01-2 vol.% oxide of Cr, Ni or Ni alloy, and has a porosity of 3% or less. A damaged part of the surface of the mold for continuous casting of which base material is high-strength Cu alloy like Cr-Zr-Cu or Cr-Zr-Al-Cu is repaired with cold spray.

JP4109567: Kurisu Yasushi. Company: Nippon Steel Corp. Issued: July 2, 2008.

Piston Pin with Slide Layer for Connecting Rod Eye for Internal Combustion Engines. Piston pin for a connecting rod in a reciprocating internal combustion engine, wherein the piston pin carries at least in the area of the running surface a thermal sprayed slide layer of a metallic bearing material or slide bearing material, as well as reciprocating internal combustion engine with a connecting rod with small and with large connecting rod eye, wherein at least the running surface of one of the piston pins is formed of a thermal sprayed slide layer of a metallic bearing material, which exhibits a lower hardness than the running surface of the corresponding connecting rod eye and process for manufacturing a described piston pin with the steps of a extrusion molding or machining a piston pin preform, introduction of a recess in the area which will later become the running surface, roughening the outer surface in the area of the recess, application of a coating of a bearing material by a thermal spray process.

DE102006008910: Becker Dirk, Brand Marcus, Izquierdo Patrick, Pellkofer Wolfgang, and Russer Christian. Company: Daimler Chrysler AG. Issued: September 11, 2008.

Plasma Lineation Electrode. A plasma spray device is provided. The plasma spray device includes a plasma chamber region for having a plasma formed and a throat region coupled to the plasma chamber region. The throat region has an end surface and an axial bore. The axial bore is formed substantially along a longitudinal axis of the throat region, and has a non-circular cross-sectional shape. The axial bore at the end surface is for ejecting a plasma stream. The axial bore may include a plurality of grooves formed substantially along the longitudinal axis of the throat region. The cross-sectional shape of the axial bore may alternatively be defined by a plurality of overlapping substantially circular lobes. The plasma stream has a flow that is lineated before the plasma stream is ejected from the axial bore. The plasma stream has an overall particle pattern angle of less than about 50° after the plasma stream exits the axial bore.

US7397013: Jones Charles Raymond and Schellin Jason James. Company: Heraeus. Issued: July 8, 2008.

Plasma Sprayed Oxygen Transport Membrane. Problem to be solved: To form oxygen and hydrogen transport membranes by plasma spray deposition on a substrate, to disclose a multi-layer composite comprising a porous substrate and membranes provided by supersonic plasma spray deposition and to form a crack-free oxygen transport membrane on a substrate by plasma spray deposition of single phase or dual phase nanocrystalline particles. Solution: The ion or electron or ion mixture and electron conductive membrane is fabricated by a method including spraying of a single phase or dual phase composition from a plasma torch or plasma gun at a supersonic velocity in the presence of an inert gas as a plasma medium and coating the surface of the porous or dense substrate with the composition in order to provide the surface of the substrate with the oxygen transport member in the shape of a ceramic coating free of micro-cracks.

JP4109462: Chen Jack Chieh-Cheng, Hankun Chan, Prasad Ravi, and Whichard Glenn. Company: Praxair Technology Inc. Issued: July 2, 2008.

Process for Processing Cylinder Crankcases having Sprayed Cylinder Barrels. In a process for processing cylinder crankcases having sprayed cylinder barrels, in which process a cylinder crankcase is cast, those surfaces of the subsequent cylinder barrels which are to be thermally coated are roughened, the cylinder barrels are coated by a thermal spraying process, and the cylinder barrels are remachined to final dimensions. After the thermal spraying process, coating material is at least partially removed from the crankshaft-side part of the cylinder crankcase.

US7415958: Boehm Jens, Brackenhammer Dieter, Diessner Stefan, Heuberger Axel, Izquierdo Patrick, Pfeffinger Herald, Schilling Dezsoe, Traber Juergen, Vocino Nazario, and Zwink Walter. Company: Daimler Chrysler AG. Issued: August 26, 2008.

Process of Plasma Arc Welding and Forming Low Oxide Coatings using a Plasma Arc Apparatus with an Environmental Cell having a Ring with Fluid Passageways. A local environmental cell for a welding spray gun includes an annular ring having a top surface and a bottom surface, wherein the annular ring is adapted for attachment to an outer perimeter of the spray gun and a plurality of fluid passageways radially disposed about the annular ring comprising a plurality of openings in the bottom surface of the ring in fluid

communication with a vacuum source for providing a vacuum thereto. The use of the local environmental cell permits deposition of local bond coats as well as minimizes the number of steps associated with welding repair processes. For example, the use of the local environmental cell permits welding and formation of a low oxide bond coat during the welding process, thereby eliminating the need for placing the substrate subsequent to a welding process in a separate spray cell to deposit the bond coating.

EP1524061: Fusaro Jr Robert Anthony and Solomon Harvey Donald. Company: General Electric. Issued: July 9, 2008.

Roller for Forming Noodles and the Like. A roller for forming noodles and the like comprises a roller body, an intermediate layer and a fluoropolymer layer. The intermediate layer is formed from a thermally sprayed material with open cells such as a ceramic. The open cells of the intermediate layer permit intrusion of fluoropolymer therein. The intermediate layer binds the surface of the roller body with the fluoropolymer layer.

US7425125: Kurachi Masayasu, Ohmi Hideto, Uchiyama Teruyuki, Sugimoto Toshiki, Yoshida Yoshitaka, and Nakamura Atsushi. Company: Yutaka Mfg Co Ltd. Issued: September 16, 2008.

Substrate Supporting Table, Method for Producing Same, and Processing System. A plasma processing system has a susceptor, provided in a processing vessel, for supporting thereon a substrate. A process gas is supplied into the processing vessel to produce the plasma of the process gas. The susceptor has a dielectric film formed on a base, and a plurality of protrusions formed on the film. The protrusions of the susceptor are formed by thermal-spraying a ceramic onto the dielectric film via an aperture plate having a plurality of circular apertures.

JP4126286: Ushioda Joichi, Sato Koichi, Satoyoshi Tsutomu, and Ito Hiromichi. Company: Tokyo Electron Ltd. Issued: July 30, 2008.

Thermal Spray Coating Process and Thermal Spray Coating Materials. Process for arc wire spraying for depositing material layers, in particular slide bearing layers, wherein at least one oxygen containing atomizing gas and one fuel gas are supplied to the spray device, which are combusted in a burn chamber in the immediate vicinity or behind the arc under the influence of a part of the oxygen containing atomizing gas and following the exit from the nozzle a flame jet or spout produces wherein that by the oxidation of the metallic components of the spray wire a metal oxide layer is formed at least on the outer surface of the spray droplets, as well as material layers, in particular bearing layers, of Cu-containing alloys with metal oxide microstructure segregated areas, wherein the material exhibits a lamella like microstructure of thicker lamellas of Cu-alloys and thinner lamellas of metal oxide, wherein the lamellas are oriented primarily parallel to the substrate of the base material.

DE102004040460: Lampmann Florian and Wittrowski Torsten. Company: Daimler Chrysler AG. Issued: July 10, 2008.

Thermoelectric Conversion Module and its Manufacturing Method. Problem to be solved: To provide a thermoelectric conversion module which has high reliability and conversion efficiency without generating a stress to a breakdown of a thermoelectric element with an electrode structure in which dense and excellent electric conductivity with much smaller air gap than that of a prior art, which can be easily increased in size and which can be efficiently manufactured. Solution: The thermoelectric conversion module comprises an insulating formwork including a plurality of through holes and a plurality of grooves for electrodes for coupling between the plurality of through holes, *p*-type thermoelectric elements and *n*-type thermoelectric elements alternately arranged in the holes, flame spraying electrodes embedded in the grooves for alternately electrically connecting in series the elements and. The flame spraying electrodes are formed of aluminum flame spraying electrodes, and a nickel aluminum flame spraying layer is provided as a substrate layer of the flame spraying electrodes.

JP4110811: Ozora Yasumasa, Nagai Atsushi, Fujii Kazuhiro, Imaizumi Yukio, Kamakura Hiroki, and Sakurada Toshio. Company: Kyushu Electric Power Ube Industries. Issued: July 2, 2008.

Water-Cooled Lance for Metallurgical Use and Manufacturing Method Therefor. Problem to be solved: To provide a water-cooled lance for metallurgical use, which can be stably used for a long time without degradation of the lance function by using a thermal sprayed film for coating an outer circumferential surface of a lance pipe, wherein the film has high heat conductivity, hardness and wear resistance and excellent film adhesiveness. Solution: In the water-cooled lance for metallurgical use, a thermal sprayed film of carbide cermet is used to coat the outer circumferential surface of the lance pipe with an undercoat of a heat-resistant alloy interposed as necessary, and the surface roughness of the thermal sprayed film of carbide cermet is $<+3.0$ μm.

JP4146112: Harada Yoshio, Okitsu Masayuki, Hashimoto Shigeru, Aoki Riichi, and Morita Takeshi. Company: Nippon Steel Corp Tocalo Co Ltd. Issued: September 3, 2008.

Feedstock

Glass Thermal Spraying Material. Problem to be solved: To provide a recycling method for effectively utilizing window glass of a scrap car as a thermal spraying material. Solution: A glass thermal spraying film is formed by a powder type gas flame spraying device by adding and mixing borosilicate glass powder with scrap glass powder obtained by pulverizing window glass for a scrap car.

JP4144868: Umagome Masakatsu. Company: Osaka Industrial Promotion Organization. Issued: September 3, 2008.

Method for Preparing Calcium Aluminate Film Containing Oxygen Radical and Laminate. C12A7 containing oxygen radicals at a high concentration, is provided at a low cost. A method for preparing an oxygen radical-containing calcium aluminate film, characterized in that it comprises subjecting a powder of oxygen radical-containing calcium aluminate to thermal spraying, and preferably the oxygen radical content in the oxygen radical-containing calcium aluminate is at least 10^{20} cm^{-3}.

US7429408: Kawasaki T., Ito K., and Ibukiyama M. Company: Denki Kagaku Kogyo Kk. Issued: September 30, 2008.

Thermal Spray Material for Repairing Industrial Furnace. Problem to be solved: To provide a thermal spray material improved in sticking property and adhesive property to form fine construction body texture of high strength and stably constructible without causing misfire also in thermal spraying to a repaired surface of relatively low temperature. Solution: The thermal spray material for repairing an industrial furnace contains fireproof raw material powder and metal Si powder as a main material, and is sprayed to the constructed surface using oxygen as carrier gas and fusion-stuck to the constructed surface with the combustion generated heat of the metal Si powder. The thermal spray material contains 3-30 mass% magnesia powder with 25 mass% or more of MgO content in the chemical composition value, 5-30 mass% metal Si powder and 50-90 mass% silica powder, and the MgO component held in the whole composition in the chemical composition value is 1-25 mass%.

JP4109663: Honda Kazuhiro. Company: Kurosaki Harima Corp. Issued: July 2, 2008.

Thermal Spray Particles and Sprayed Components. Rare earth-containing compound particles of polyhedral shape having an average particle diameter of 3-100 μm, a dispersion index of up to 0.5, and an aspect ratio of up to 2 can be thermally sprayed to form an adherent coating, despite the high melting point of the rare earth-containing compound. A sprayed component having the particles spray coated on a substrate surface is also provided.

EP1247786: Kaneyoshi Masami and Maeda Takao. Company: Shinetsu Chemical Co. Issued: August 20, 2008.

Pretreatment and Posttreatment

Method for Coupling Thermal Spraying Layer and Iron and Steel Members. Problem to be solved: To provide a method for more strongly joining thermal spraying layers to iron and steel members by sufficiently bringing the thermal spraying layers containing ceramics into tight adhesion to the surfaces of the iron and steel members. Solution: When a steel work undergoing a hardening process and a thermal spraying process is tempered, the thermal spraying layer attains the state that ceramic powder, etc., are dispersed into a self-fluxing alloy after tempering and the thermal spraying layer is joined by a diffusion joint layer to the steel work. According to the present invention, the joining strength of the thermal spraying layer and the iron and steel members can be enhanced and the adequate dispersion of the ceramic powder is made possible by employment of the self-fluxing alloy. Consequently, the lifetime and durability of the work can be exponentially enhanced.

JP4156963: Mukoda Yukihiro, Ishii Yuji, and Kosugi Masaki. Company: Honda Motor Co Ltd. Issued: September 24, 2008.

Spraying Systems and Methods

Cold Spray Apparatus and Method with Modulated Gasstream. The cold gas spray apparatus has a high pressure gas generator for the production of a high pressure gases and a nozzle from which a cold gas particle stream is emitted. An influencing medium is provided. The cold gas particle stream is guided for variable modification of the characteristics temperature, pressure, particle density, particle material and velocity. A property of the cold gas particle stream is periodically modifiable by influencing medium. An independent claim is also included for a cold gas spraying method by the cold gas spray apparatus.

EP1806429: Jabado Rene, Jensen Jens Dahl Dr, Krueger Ursus Dr, Koertvelyessy Daniel, Luethen Volkmar Dr, Reiche Ralph, Rindler Michael, and Ullrich Raymond. Company: Siemens AG. Issued: July 9, 2008.

Gas-Thermal Method of Spray Coating Rotation Body and Device for Implementing Method. Substance: Method involves displacement of a sprayer along a rotation body and turning the sprayer in the plane of displacement such that, the longitudinal axis of the sprayer is perpendicular to the rotation body. Turning the sprayer is done about an axis, passing through the center of the sprayed spherical surface. In the device for gas-thermal spray coating a rotation body, the mechanism of out-in traverse of the sprayer is made in form of two levers, joined to each other by a bar. The end of one of the levers is fixed to the case of a holder frame, and the end of the other is fixed to the axis of a hinge. The mechanism of azimuthal displacement of the sprayer is made in form of a beam with a triangular groove and hinged to a disc, on which there are supports, limiting movement of the beam. The mechanism for moving the sprayer along its longitudinal axis is made in form of plates, one end of which is joined to the sprayer, and the other end is made with bending and encircles the beam. The plate itself is fixed on the beam using a screw, moving along the triangular groove of the beam. Besides that, the axis of the hinge passes through the axis of rotation of a spindle and the center of a spherical surface. The simple structure of the proposed device allows for simplifying its production and easier control. The proposed device is simple and convenient for operation. Effect: increased uniformity of spray coating when reconstructing objects with a spherical surface; lowering of power consumption of the process; simplification of the structure of the coating device and easier of control.

RU2328352: Khraponichev Dmitrij Nikolaevi, Khromov Vasilij Nikolaevich, Korenev Vladislav Nikolaevich, and Zajtsev Sergej Aleksandrovich. Company: Orlovskij Gosudarstvennyj Agrarnyj Universitet. Issued: July 10, 2008.

Method and Apparatus for Electric Arc Spraying. Arc spraying uses spray gun with two electrically conductive spray wires and first supply device to supply fluid, with electrical voltage applied to wires. The wires are fed by wire guide, an arc being ignited by the voltage. The wires are converted into melt in melting region and the melt is applied to the fluid to surface of body. Particles from storage container are supplied to the melt. An Independent claim is also included for an apparatus for arc spraying comprising the spray gun that includes the wire guide and first supply device.

EP1358943: Barbezat Gerard and Warnecke Christian. Company: Sulzer Metco AG. Issued: July 30, 2008.

Method and Apparatus for Thermal Spraying on Inner Surface of Cylinder. Problem to be solved: To form a stable thermal spraying film on the inner surface of a cylindrical work through thermal spraying by using a thermal spraying method and apparatus. Solution: A masking member is

placed via a spacer on the upper end of the cylinder block. The masking member is equipped with a cylindrical member having the same inner diameter as that of the cylinder bore. A droplet is sprayed from a thermal spraying gun in a direction slanted at a spraying angle θ1 from the central axis. The spraying angle θ1 is secured by a downward current which flows through the cylinder bore. The masking member is placed to generate a current near the upper end of the cylinder block and the inside and to yield a spraying angle for spraying a bore surface around the upper end equivalent to that inside.

JP4111072: Shimizu Akira, Shiotani Eiji, Kiyohara Shinji, and Matsuyama Hidenobu. Company: Nissan Motor. Issued: July 2, 2008.

Method and Assembly for Masking. A mask assembly for protecting a portion of a workpiece from over spray while coating a preselected surface of the workpiece with thermal spray. The mask assembly includes a sheet sized and shaped for covering the portion of the workpiece which the assembly is intended to protect and a support plate selectively mountable over the sheet while the surface is coated with thermal spray. The mask assembly also includes a clamp mountable on the support plate for selectively attaching the support plate to the workpiece thereby clamping the support plate and sheet in position over the portion of the workpiece.

EP1293584: Brown Peter Martin. Company: General Electric. Issued: July 9, 2008.

Method and Device for Thermal Spraying to Inner Surface of Cylinder Bore. Problem to be solved: To prevent a thermal-sprayed film from being peeled by shortening the thermal spraying time, and suppressing the internal stress generated by the differential thermal expansion between a base metal and a thermal spraying material as small as possible. Solution: In forming a thermal-sprayed film on an inner surface of a cylinder bore by inserting a rotary thermal spraying gun into the cylinder bore of a cylinder block, and thermal spraying a thermal spraying material different from the material of the cylinder bore from a rotary thermal spraying gun reciprocating in the direction of the axis while rotating around the axis of the cylinder bore, the thermal spraying is achieved while measuring the surface temperature of the thermal-sprayed film formed on the inner surface of the cylinder bore, the thermal spraying condition by the rotary thermal spraying gun is controlled based on the measured surface temperature of the thermal-sprayed film, and the temperature of the inner surface of the cylinder bore is suppressed to be at a specified value or under.

JP4110436: Katsu Masahiko and Takeo Yoshihiro. Company: Nissan Motor. Issued: July 2, 2008.

System for Injecting Gas into a Detonation Projection Gun. The system for injecting gas for a detonation projection gun does not incorporate mechanical closing valves or systems for the supply of combustible gas or other inert additive compounds such as nitrogen, argol, helium or the like. On the contrary, the supply of gas or compounds occurs directly and separately to the detonation chamber through a series of independent passages, one for the comburant and at least another passage for the combustibles, each passage being comprised of an expansion chamber and of a plurality of distribution conduits having a reduced cross-section and/or extended length. The expansion chamber of each passage communicates directly with the corresponding supply line whereas the distribution conduits are conveniently distributed so that multiple gas injection points open out at the internal surface of the combustion chamber in order to produce a continuous and separate supply of gas at multiple points thereby ensuring a direct and homogenous combustible mixing in the combustion chamber and with a flow which is sufficient to fill the chamber in each detonation cycle.

JP4155706: Barykin Georgy Yur Evich and Fagoaga Altuna Inaki. Company: Aerostar Coating S L. Issued: September 24, 2008.

Thermal Spraying Apparatus. Thermal projection torch is controlled by an instrument with which the characteristics of the projected jet and the temperature of deposition of the piece are measured by sensors incorporating a camera and a combined pyrometer. The data gathered is analyzed by a computer and a signal is transmitted to a control box to correct the operating parameters of the torch. The computer incorporates software for analyzing in real time the data collected on the jet characteristics and to calculate a new feed parameter for the operation of the projection torch.

US7404860: Vardelle Michel, Boussoutrot Cedric, Hoffmann Hakim, Renault Thiery, and Braillard Frederic. Company: Snecma Services. Issued: July 29, 2008.

Thermal Barrier Coatings and Bondcoats

Gas Turbine Engine and Method of Producing the Same. A raw material powder having particle sizes of not more than 125 μm and preferably not more than 75 μm, such as a powder of an alloy of Co-32% Ni-21% Cr-7.5% Al-0.5% Y is thermally sprayed onto surfaces of shroud members of a shroud to form a coating. The high velocity oxygen-fuel thermal spray method is used as the thermal spray method. In the obtained coating, the porosity is 5-30% by volume and the oxygen content is not more than 2% by weight. In particular, when the raw material powder has particle sizes of about 40 μm, it is possible to obtain the coating which has an extremely small oxygen content of about 0.5% by weight.

JP4130894: Kokusho Tsuyoshi. Company: Honda Motor Co Ltd. Issued: August 6, 2008.