

VT

PATENTES

IMPRESIÓN 3D

8



OBJETIVOS
DE DESARROLLO
SOSTENIBLE



Vigilancia
Tecnológica
4º trimestre 2021

NIPO: 116-19-050-9

En este Boletín de Vigilancia Tecnológica se recogen, de manera trimestral, los avances acontecidos en el campo de la tecnología de Impresión 3D que se materializa en forma de solicitudes de patente en todo el mundo.

Aunque en los años 80 comenzaron a desarrollarse los primeros equipos y materiales sobre la tecnología de impresión 3D también denominada fabricación aditiva, no fue hasta 1986 cuando aparece en el mercado la primera impresora 3D comercial, patentada por Charles W. Hull, premiado por la Oficina Europea de Patentes

como inventor del año en 2014 en la categoría de inventores no europeos.

Cuando trataba de buscar un sistema para mejorar el proceso de realización de prototipos de pequeñas piezas de plástico que utilizaba para testar nuevos diseños de productos, desarrolló una máquina de impresión 3D que conseguía realizar en pocos minutos procesos que por aquel entonces llevaban semanas.

Contenido



PROCESOS



MATERIALES



DISPOSITIVOS



PRODUCTOS



PROCESAMIENTO
DE DATOS



Desde entonces, la tecnología no ha parado de evolucionar, especialmente en los últimos años, alcanzándose a partir de 2017 un verdadero auge, cuando se incorpora la automatización utilizando software de inteligencia artificial que permite industrializar la fabricación aditiva y multiplicar la capacidad de los sistemas. En estos momentos, en que la pandemia del corona virus SARS-CoV-2 azota a la población mundial, la impresión 3D se ha puesto de gran actualidad. La necesidad de fabricar de forma urgente respiradores o material de protección personal ha despertado el interés por la utilización de esta tecnología, surgiendo así multitud de iniciativas públicas y privadas.

En los últimos años de evolución de la impresión 3D hemos visto pasar del desarrollo conjunto de nuevas tecnologías y materiales innovadores aplicados principalmente a la creación de prototipos y diseños personalizados, a la consecución de productos casi impensables hace tan solo una década. Gracias a esta increíble tecnología hemos visto imprimir, órganos, coches e incluso edificios.

Desde la Oficina Española de Patentes y Marcas, y en cumplimiento de su doble objetivo de proteger y fomentar la innovación tecnológica en nuestro país, así como de divulgar la información técnica que contienen las patentes a través de sus

servicios de Información Tecnológica, se realiza este nuevo Boletín de Vigilancia Tecnológica, que se suma a los dieciséis *Boletines VT* que venimos publicando desde el año 2000 con periodicidad trimestral. Nuestro objetivo es dar a conocer las nuevas solicitudes de patentes que se publican a nivel mundial relacionadas con la tecnología de impresión 3D.

En este Boletín, se incluye una selección de las solicitudes de patentes publicadas a nivel mundial durante el cuarto trimestre de 2021, distribuidas en cinco apartados: procesos, materiales, dispositivos, productos y procesamiento de datos.

Para cada patente se incluye su número de publicación, con un enlace que permite la consulta del documento completo, el solicitante, el país de origen y su título.

Esperamos que la información aportada en este Boletín de Vigilancia Tecnológica, sirva para identificar tendencias tecnológicas y sus actores, así como para contribuir a la utilización del conocimiento contenido en los documentos de patente como punto de partida para emprender nuevas actividades de investigación y desarrollo. Para suscribirse a este Boletín basta con cumplimentar este [formulario de suscripción](#).

ANÁLISIS ESTADÍSTICO DE LAS SOLICITUDES DE PATENTE PUBLICADAS EN EL PERIODO 2015-2021

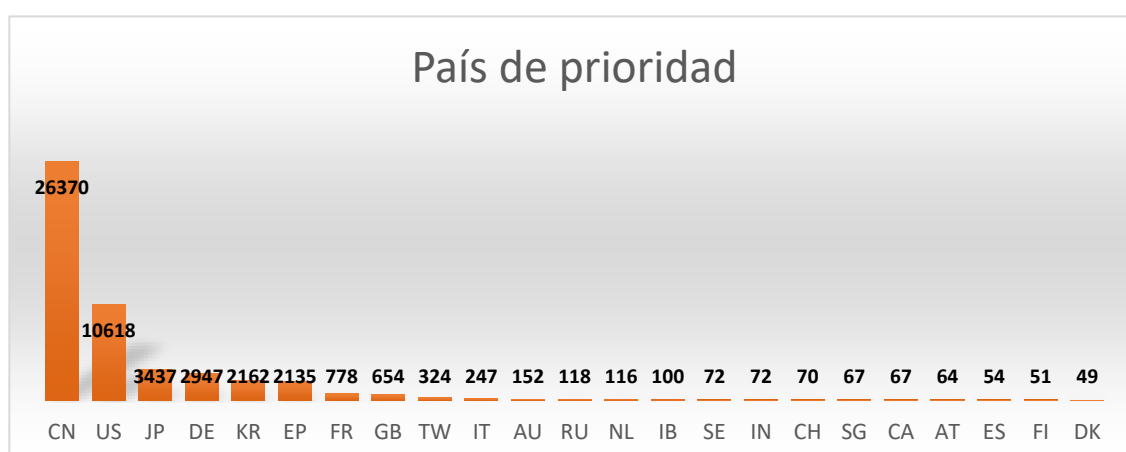
Se ha realizado un estudio estadístico con el fin de analizar la evolución tecnológica de la Impresión 3D en lo que respecta a la protección de invenciones por medio de patentes de invención. Continuando con la filosofía aplicada para el análisis de esta evolución, se han extraído los datos de las publicaciones de solicitudes de patentes publicadas desde el año 2015, momento en el que se pudo apreciar claramente el despegue de esta tecnología en términos de innovación. La herramienta empleada para este estudio ha sido Global Patent Index (GPI) de la Oficina Europea de Patentes, extrayéndose los datos a fecha de 20/01/2022. Se han recuperado un total de 50.472 familias de patentes, que corresponden a 120.336 documentos de patente.

En la Gráfica 1 se recoge la evolución del número de solicitudes del sector desde el año 2015. En ella se observa que, tras la tendencia al alza, el año 2021 se ha producido una cantidad similar al año 2020.



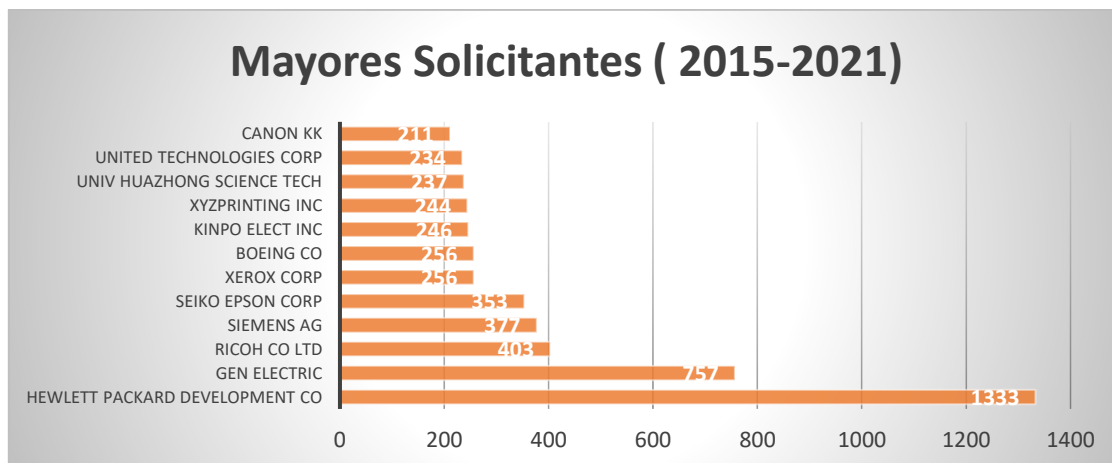
Gráfica 1. Número de solicitudes publicadas por año desde el 2015 hasta el 2021

La Gráfica 2 agrupa los documentos de patente recuperados con relación al país de origen de la tecnología de impresión 3D. Se puede apreciar que China figura en primer lugar, con una enorme diferencia respecto del segundo país con mayor número de publicaciones, que es Estados Unidos. En el caso de España, nuestro país figura en el puesto número 21, con 54 patentes publicadas.



Gráfica 2: Documentos de patente agrupados por país de prioridad

La Gráfica 3, se muestra la relación de los solicitantes con mayor número de patentes publicadas en relación con la tecnología de Impresión 3D. Se observa que, de manera casi exclusiva, los grandes titulares de la innovación son empresas, destacando la empresa Hewlett Packard como líder del sector.



Gráfica 3: Mayores solicitantes de solicitudes de patente

Para finalizar, la Gráfica 4 plasma la actividad innovadora de las mayores empresas en el sector, año a año. Se puede observar que, para las empresas más punteras, el año 2019 fue el más activo, viéndose ligeramente reducido en el año 2020 y manteniéndose relativamente estable en el año 2021.



Gráfica 4: Actividad en la solicitud de patentes año a año de los mayores solicitantes de patentes de impresión 3D.

Procesos



Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
KR102338498	KOREA ELECTRONICS TECHNOLOGY INST [KR]	3D Method for making assistant support for 3D printing output stability
WO2021251955	HEWLETT PACKARD DEVELOPMENT CO [US]	Build material extraction
US2021354374	QATAR FOUND EDUCATION SCIENCE & COMMUNITY DEV [QA]	3D printing based on self-assembled molecular building blocks for materials design and bio-applications
US2021354413	NIKE INC [US]	Footwear assembly method with 3D printing
WO2021224856	GRAF SYNERGY SRL [IT]	Process for the three-dimensional printing of hollow manufactured articles
DE102021110907	LEIBNIZ INST POLYMERFORSCHUNG DRESDEN EV [DE]	Method for production of components from fiber-plastic composites
WO2021216072	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing method
CN113442430	UNIV GUANGDONG TECHNOLOGY	A preparation method of diamond composite material based on light-curing 3D printing and forming and application
WO2021222785	UNIV TEXAS TECH SYSTEM [US]; TEXAS A & M UNIV SYS [US]	Methods of 3D printing thermosetting polymers and continuous fiber composites via in-situ self-propagation curing and systems thereof
WO2021209344	SIGNIFY HOLDING BV [NL]	Luminaire with texture perforation
WO2021216087	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing
WO2021211096	HEWLETT PACKARD DEVELOPMENT CO [US]	Additively manufacturing a lattice structure including a separable portion
JP6949187	HOTTY POLYMER INC	Manufacturing method of silicone rubber model by 3D printer
LU101722	UNIV HAMBURG [DE]	Step-wise formation of a three-dimensional structure employing different resolutions
WO2021193185	MIMAKI ENG CO LTD [JP]; UNIV CHIBA NAT UNIV CORP [JP]	Region configuration prediction method, region configuration prediction device, method for generating shaping data, shaping method, shaping data generation device, shaping system, method for generating printing data, printing method, printing data generation device, and printing system
CN113383765	UNIV SOUTHERN MEDICAL	Digital preservation method for cast specimens of human calf arteries
KR102341641	SAMDUK TONGSANG CO LTD	A method for manufacturing a midsole integrated outsole
WO2021252736	ALLOY ENTPR INC [US]; CHEATHAM LYLE [US]	Bonding methods for laminated light alloy parts
EP3915697	GEN ELECTRIC [US]	Water-based binders and methods of use in additive manufacture of parts

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
FR3110107	CENTRE NAT RECH SCIENT [FR]; UNIV CLAUDE BERNARD LYON [FR]; INST NAT SCIENCES APPLIQUEES LYON [FR]; ECOLE SUP CHIMIE PHYS ELECTRONIQ LYON [FR]	Additive manufacturing process in an adjustable constrained environment
KR102325433	TAK W J	Blade for wind power generation and manufacturing method thereof
WO2021224816	DE MARCO CARMELA [CH]	High resolution 3D printing process of complex structures
EP3878635	AIRBUS OPERATIONS SLU [ES]	Method for manufacturing a part
EP3875249	TNO [NL]; CHEMELOT SCIENT PARTICIPATIONS B V [NL]	Resin based additive manufacturing process, container and additive manufacturing system
CN113510242	SHANGHAI HANGYI HIGH-TECH DEV RES INST	A rapid forming method for 750°C resistant titanium-based composite material cylindrical part
CN113500205	UNIV JILIN CHONGQING RES INST	3D printing method of bimetallic materials
DE102020113250	BAYERISCHE MOTOREN WERKE AG [DE]	Method for producing a vehicle structural component
WO2021182050	KOBE STEEL LTD [JP]	Method for manufacturing additively manufactured article, and additively manufactured article
EP3922440	EOS GMBH ELECTRO OPTICAL SYSTEMS [DE]	Method for generating an irradiation control data record for a device for additive production
EP3909750	CL SCHUTZRECHTSVERWALTUNGS GMBH [DE]	Method for additive production of three-dimensional objects
WO2021214465	XAAR 3D LTD [GB]	Methods and associated controllers for apparatus for the layer-by-layer formation of three-dimensional objects
FR3110484	ARIANEGROUP SAS [FR]; CENTRE NAT ETD SPATIALES [FR]	Method for assembling a first metal part with a second part made of organic matrix composite material, and part resulting from such an assembly

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Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
ES2858483	ASOCIACION DE LA IND NAVARRA AIN [ES]	Zein-based thermoplastic composition for additive manufacturing
EP3892445	BONDTECH AB [SE]	Filament feeding device for use in 3D-printing.
US2021301135	UNIV VIRGINIA COMMONWEALTH [US]	Nitric oxide-releasing three-dimensional printing composition used to manufacture nitric oxide-releasing medical device
US2021274926	APPLIED MATERIALS INC [US]	Brush, method of forming a brush, and structure embodied in a machine readable medium used in a design process
US2021276249	BMF MATERIAL TECH INC [CN]	Immersion multi-material projection micro stereolithography
WO2021194462	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing with hindered phenolic antioxidants
CN113388075	ZHUHAI SAINA 3D TECHNOLOGY CO LTD	Composition for 3D printing
CN113372698	UNIV FUJIAN NORMAL QUANGANG PETROQUIMICA	Elastomer PLA/TPU 3D printing wire and preparation method thereof
KR20210128785	UNIV SOGANG RES & BUSINESS DEV FOUND	Bio ink composition for manufacturing cartilage mimetic and method for manufacturing cartilage mimetic using the same
WO2021236106	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing kit with food contact compliant agents
WO2021221624	HEWLETT PACKARD DEVELOPMENT CO [US]	Hydroxyphenyl benzotriazole, surfactant and water used as fusing agent for three-dimensional printing
WO2021221645	HEWLETT PACKARD DEVELOPMENT CO [US]	Hydrogels for three-dimensional printing
US2021331374	UNIV TEXAS [US]; UNIV PITTSBURGH COMMONWEALTH SYS HIGHER EDUCATION [US]	Extrusion printing of liquid crystal elastomers
WO2021236427	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing with food contact compliant agents
US2021316501	NAT TECH & ENG SOLUTIONS SANDIA LLC [US]	Structural metamaterials comprising interpenetrating lattices
WO2021198828	3M INNOVATIVE PROPERTIES CO [US]	Core-sheath filaments with a curable composition in the core
WO2021201834	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing with thermoplastic elastomeric particles and lower alkyldiol organic co-solvents
EP3885141	RICOH CO LTD [JP]	Resin powder, three-dimensional object producing method using the resin powder, and three-dimensional object producing apparatus

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
EP3885142	RICOH CO LTD [JP]	Resin powder, resin powder for producing three-dimensional object, three-dimensional object producing method, and three-dimensional object producing apparatus
EP3882300	RICOH CO LTD [JP]	Resin powder and resin powder for producing three-dimensional object, and three-dimensional object producing method and three-dimensional object producing apparatus
WO2021177950	HEWLETT PACKARD DEVELOPMENT CO [US]	Hydrogel three-dimensional printing
WO2021183116	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing kits with dihydrazides
WO2021228960	KANTHAL AB [SE]	Fe-Cr-Al powder for use in additive manufacturing
EP3910276	BLUEFORS OY [FI]	Heat exchanger material and heat exchanger for cryogenic cooling systems, and a system
WO2021201106	HITACHI METALS LTD [JP]	Ni-Cr-Mo alloy member, Ni-Cr-Mo alloy powder, and composite member
EP3912816	DAIDO STEEL CO LTD [JP]	Metal powder
DE102020203436	SIEMENS AG [DE]	Cobalt base alloy, powder mixture, process and component
EP3881954	SANDVIK MACHINING SOLUTIONS AB [SE]	A powder for additive manufacturing, use thereof, and an additive manufacturing method

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Dispositivos



Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
ES2884002	CASAS ALVAREZ JUAN [SP]	Sistema de extrusor y alimentador de gránulo y dosificador de aditivo líquido para impresoras 3D
WO2021230789	CELLINK AB [SE]	Bioprinter and method for calibration of the bioprinter
US2021331418	SEIKO EPSON CORP [JP]	Three-dimensional shaping apparatus and three-dimensional shaped article production method
WO2021214465	XAAR 3D LTD [GB]	Methods and associated controllers for apparatus for the layer-by-layer formation of three-dimensional objects
US2021299965	SEIKO EPSON CORP [JP]	Three-dimensional shaping apparatus and three-dimensional shaped article production method
US2021276257	HILL CURTIS WAYNE [US]; SCIPERIO INC [US]	Laser oven
WO2019025978	ETHICON LLC [US]	System and method for additive manufacture of medical devices
WO2021192988	SCREEN HOLDINGS CO LTD [JP]	3-dimensional shaping device
WO2021221599	HEWLETT PACKARD DEVELOPMENT CO [US]	Dehumidify and recycle a gas from a 3D printer
WO2021216087	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing
WO2021183263	CARBON INC [US]	Additively manufactured products having a matte surface finish
WO2021236106	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing with food contact compliant agents
WO2020028122	INTREPID AUTOMATION [US]	Multiple image projection system for additive manufacturing
WO2021236907	GEORGIA TECH RES INST [US]; SAHA SOURABH KUMAR [US]	System and method to control defects in projection-based sub-micrometer additive manufacturing
WO2021236686	GENESIS DIMENSIONS LLC [US]	Robotic platform for construction
KR20210125704	3D CONTROLS CO LTD [KR]	Top-down 3D printing devices with high viscosity materials and control method thereof
WO2021222785	UNIV TEXAS TECH SYSTEM [US]; TEXAS A & M UNIV SYS [US]	Methods of 3D printing thermosetting polymers and continuous fiber composites via in-situ self-propagation curing and systems thereof
WO2021215909	ULTIMAKER B V [NL]	Fused filament fabrication system with interchangeable print heads and filament
WO2021211049	FREEMELT AB [SE]	Preheating of powder bed

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
DE102020109847	HOGROTEC GMBH [DE]	Printing device, preferably a 3D printer
WO2021199094	AXTRA3D INC [US]; ZITELLI GIANNI [IT]	Apparatus for bottom-up stereolithography with an lcd light source with led matrix and tank with elastic membrane bottom with reduced and variable thickness, and method of use
EP3792041	SEIKO EPSON CORP [JP]	Three-dimensional shaping device and method for manufacturing three-dimensional shaped object
WO2021201848	HEWLETT PACKARD DEVELOPMENT CO [US]	Reflective agents in 3D printers
WO2021194480	HEWLETT PACKARD DEVELOPMENT CO [US]	3D printing non-powered compartments with passive latches
US2021347116	IO TECH GROUP LTD [GB]	Systems and methods for negative 3D printing machine at high resolution
US2021362239	KILNCORE INC [CA]	High temperature, high pressure, powder-based, 3D printed object manufacturing
DE102020208174	BOSCH GMBH ROBERT [DE]	3D printer for automated series production
WO2021220277	STRATASYS LTD [IL]	Service station for a three-dimensional printing system
JP2021160314	MICROJET KK [JP]	System for discharging liquid material by inkjet head
EP3912752	JEOL LTD [JP]	Electron beam adjustment method and three-dimensional powder bed fusion additive manufacturing apparatus
US2021323231	FUSION3 DESIGN LLC [US]	Liquifier assembly
US2021323230	3D SYSTEMS INC [US]	Three dimensional printing system with precision optical path
US2020298478	ESSENTIUM INC [US]	Three-dimensional printer head including an automatic touchdown apparatus
KR102308150	ROKIT HEALTHCARE INC [KR]	3D syringe module for bio 3D printer
US2018345573	STRATASYS INC [US]	System and method for 3D printing with metal filament materials
KR20210147472	3DNARA CO LTD [KR]	Filament connector
EP3339002	BOEING CO [US]	Fused filament fabrication machine
KR20210131585	CARIMA CO LTD [KR]	Three dimensional printer with transparent bottom surface and molding plate
WO2021221900	CARBON INC [US]	Film remover apparatus for additive manufacturing build platforms and related methods
WO2021220275	STRATASYS LTD [IL]	System for improving safety in three-dimensional printing
US2021316508	BOEING CO [US]	Automated vibrational powder removal for additive manufacturing
DE102020111593	WERLING MARCO [DE]	Connection unit for connecting workpiece in context of additive manufacturing to saw carriage of saw
US2021245438	MICROCVD CORP [US]	Drop-on-demand additive manufacturing printhead

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
US2018056587	CANON KK [JP]	Three dimensional manufacturing apparatus and method for manufacturing three dimensional manufactured product
WO2021221786	VULCANFORMS INC [US]	Melt pool control in additive manufacturing systems
US2021323072	UT BATTELLE LLC [US]	Alignment system for magnetic particulate material used for additive manufacturing
US2019126413	GEN ELECTRIC [US]	Diode laser fiber array for contour of powder bed fabrication or repair
DE202019005744	GUEHRING KG [DE]	Printer nozzle for processing three dimensional (3d) printing material for use in 3D printer device
WO2021205174	E3D ONLINE LTD [GB]	Liquefier for an extrusion-based additive manufacturing system and method for its manufacturing
WO2021206604	L3F SWEDEN AB [SE]	Valve assembly for ejection of a viscous media in a 3D printing device
WO2021195375	UNIV MISSOURI [US]	Three-dimensional printing of reinforced concrete and nozzle therefor
DE102020117458	BAYERISCHE MOTOREN WERKE AG [DE]	Device for de-powering additively manufactured component vehicle component
FR3111839	SAFRAN HELICOPTER ENGINES [FR]; SAFRAN TRANS SYSTEMS [FR]	Circular modular plate for additive manufacturing on power bed of part with axis of revolution
DE102020116030	EOS GMBH ELECTRO OPTICAL SYSTEMS [DE]	Filter device used in additive manufacturing device for purifying process gas for manufacturing three dimensional component
KR102337814	CLECELL CO LTD [KR]	3D leakage prevention system of downward spary type nebulizer in 3D printer for stacking a biomaterial
KR20210152761	ROKIT HEALTHCARE INC [KR]	3D metal syringe module for bio 3D printer

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Productos



Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
WO2021187676	POSTECH RES & BUSINESS DEV FOUND [KR]; UNIV NAT CHONNAM IND FOUND [KR]	Ischemic heart disease animal model using 3-dimensional bioprinted occlude, and manufacturing method therefor
JP2021186892	TOSHIBA ENERGY SYSTEMS & SOLUTIONS CORP	Steam valve rubbing jig and tool and steam valve valve seat rubbing jig and tool manufacturing method
CN113476655	UNIV SICHUAN	3D printed bone repair composite scaffold and preparation method
CN214873141	UNIV GUANGZHOU	A bionic honeycomb panel and 3D printer based on microscopic woodpecker beak
CN113577379	UNIV QILU TECHNOLOGY	Bone repair scaffold capable of directionally inducing differentiation of bone tissue
CN113521263	UNIV SOOCHOW	A 3D printed tumor vaccine composition and its preparation method and application
CN214857849	QUZHOU PEOPLES HOSPITAL	A 3D printed artificial vertebral plate that can maintain the stability of the back of the cervical spine
WO2021243406	AMAERO ENG PTY LTD [AU]	A fiberizer tool and method for fabricating like tooling
CN113520664	XIAMEN BONAI MODEL DESIGN CO LTD	Vaginal relaxation correction prosthesis and its usage
CN113615907	QINGFENG BEIJING TECHNOLOGY CO LTD	A new type of 3D printed mask
US2021346147	IBM [US]	Bioprinted living tissue with therapy capability
KR20210142458	YANG Y K	Complete management chipset Wig for pets and pet care system using it
KR102331027	UNIV GACHON IND ACADEMIC COOP FOUND	Uterus-ovary biochip
FR3110482	ARIANEGROUP SAS [FR]; CENTRE NAT ETD SPATIALES [FR]	One-piece assembly structure comprising a first metal part and a second part made of organic matrix composite material
DE102020112100	FRITZ WINTER EISENGIESSEREI GMBH & CO KG [DE]	Component of a brake for a vehicle,
US2021338459	HANGER INC [US]	Orthotic and prosthetic device and manufacturing system and method
EP3907025	GEN ELECTRIC [US]	Conforming coating mask for a component and system
EP3903615	DRAEGER SAFETY AG & CO KGAA [DE]	Protective helmet with connections between interior equipment and supporting structure
US2021330030	HILOS INC [US]	System and methods for lasting an upper to a 3D printed platform

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
EP3900560	DEDIENNE MULTIPLASTURGY GROUP [FR]	Filtering protective mask
EP3892411	BOEING CO [US]	Article comprising additively manufactured metal portions
WO2021205006	MANKAU DIETER [DE]	Footwear midsole and running shoe produced therewith
CN113427019	UNIV PEKING THIRD HOSPITAL	Composite material and structural function metal bone implant
WO2021188975	MAT NV [BE]; MAT USA LLC [US]	Scaffold based implants
US2021253256	BOEING CO [US]	Configurable vehicle seat and method therefor
EP3888798	GEN ELECTRIC [US]	Cantilevered mask for openings in additively manufactured part
EP3889390	ITP ENGINES UK LTD [GB]	Rotatable forged disc for a bladed rotor wheel and a method for manufacturing thereof
EP3884801	ROSSIGNOL LANGE SRL [IT]	Gliding shoe comprising a shock absorber element

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Procesamiento de Datos



Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
US2021362430	ESSENTIUM INC [US]	System and method of detecting failed bed adhesion for a three-dimensional printer
EP3922440	EOS GMBH ELECTRO OPTICAL SYSTEMS [DE]	Method for generating an irradiation control data record for a device for additive production
WO2017123268	HONEYWELL FED MFG & TECH LLC [US]	System, method, and computer program for creating geometry-compliant lattice structures
WO2021221615	HEWLETT PACKARD DEVELOPMENT CO [US]	Evaluating dimensional accuracy based on weighting factors
WO2021236085	HEWLETT PACKARD DEVELOPMENT CO [US]	Building objects having flat bottom surfaces
WO2021201818	HEWLETT PACKARD DEVELOPMENT CO [US]	Geometric compensations
TW202114851	IND TECH RES INST [TW]	Parameter analysis metho, electronic device and non-transitory computer readable storage medium
US11161307	KEMEERA INC [US]	Data aggregation and analytics for digital manufacturing
WO2019005413	THERMWOOD CORP [US]	Methods and apparatus for compensating for thermal expansion during additive manufacturing
US2021302302	RAYTHEON CO [US]	Method and system for abrasion testing of materials
JP2021167452	JTEKT CORP [JP]	Additive manufacturing assistance apparatus used for additive manufacturing system
JP2021163229	RICOH KK [JP]	Information processing apparatus for 3D molding system
JP2021160241	MITSUI CHEM INC [JP]	Three-dimensional data arrangement method of optical molding
WO2021206676	HEWLETT PACKARD DEVELOPMENT CO [US]	Support structure generation for 3D printed objects
WO2021193185	MIMAKI ENG CO LTD [JP]; UNIV CHIBA NAT UNIV CORP [JP]	Region configuration prediction method, region configuration prediction device, method for generating shaping data, shaping method, shaping data generation device, shaping system, method for generating printing data, printing method, printing data generation device, and printing system
US2021276249	BMF MATERIAL TECH INC [CN]	Immersion multi-material projection micro stereolithography
WO2021188118	HEWLETT PACKARD DEVELOPMENT CO [US]	Print job processing
WO2021194496	HEWLETT PACKARD DEVELOPMENT CO [US]	Additive manufacturing of support structures having identifiers

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
KR20210112058	COPTIQ CO LTD [KR]	System and method for making a custom mask guard using a true depth camera
US2021323225	3D SYSTEMS INC [US]	Three-dimensional printing system throughput improvement by sensing volume compensator motion
WO2021194479	HEWLETT PACKARD DEVELOPMENT CO [US]	Processing systems with a plurality of supply reservoirs
WO2021211096	HEWLETT PACKARD DEVELOPMENT CO [US]	Additively manufacturing a lattice structure including a separable portion
DE102020208175	BOSCH GMBH ROBERT [DE]	Method for creating production plan for additive manufacturing of objetc

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