

VT

PATENTES

IMPRESIÓN 3D

5



Vigilancia
Tecnológica
1^{er} trimestre 2021

NIPO: 116-19-050-9

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 probar 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 primer 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*](#).

Procesos



Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
CN11236633	CAS DALIAN CHEM & PHYSICAL INST	3D printing processing method of conductive partition plate with gas-liquid distribution flow field
CN112338201	SUZHOU ZHUYOU 3-DIMENSION TECHNOLOGY CO	Method of 3D printing synchronous heat treatment
CN112296353	ANHUI YUANCHEN ENVIRONMENTAL PROTECTION	Method for preparing metal and polymer material composite 3D printing filamen
CN112402067	AFFILIATED REHABILITATION HOSPITAL NAT	Method for preparing artificial metatarsophalangeal joint prosthesis
CN112405772	UNIV CHANGSHA	Method for repairing damaged ceramics by using 3D scanning and 3D printing technology
US2021060854	INTREPID AUTOMATION [US]	Closed loop print process adjustment based on real time feedback
WO2021040693	HEWLETT PACKARD DEVELOPMENT CO [US]	Modifying print data near and/or at overlap areas between printhead dies
CN112373010	UNIV XIAN POLYTECHNIC	3D printing method of quadrilateral mesh fabric
KR102220958	KOREA ADVANCED INST SCI & TECH [KR]	3D method for manufacturing multi composite materials and 3D printing apparatus performing thereof
JP2021028128	UNIV YOKOHAMA NAT	Microfluidic device and its manufacturing method
CN112277335	SHANGHAI TUNNEL ENG CO LTD	Method and structure of 3D printing technology to form a gravel-attached filter for button-type dewatering well
KR102207908	DAWIN [KR]	3D Manufacturing method of rice plastic molding by 3D printing
CN112140532	HUARONG PURUI BEIJING TECH CO LTD	Novel manufacturing process of PC-ABS automobile interior parts
KR20200134176	UNIV KOREA RES & BUS FOUND [KR]	Method for producing three-dimensional open porous scaffolds with controlled macro/micro-porous structure and three-dimensional porous scaffolds manufactured thereby
CN111844756	SUZHOU HEACAD HEARING TECH CO LTD	Method for preparing soft eardrum based on 3D printing technology
CN111823573	UNIV SICHUAN	Manufacturing method for 3D printing workpiece with high interfacial heat conductivity

Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
US2020353684	OANGE MAKER LLC [US]	Security features and anti-counterfeiting and part tracking system for 3D printed parts
EP3769796	FUND BADAN I ROZWOJU NAUKI [PL]; MEDISPACE SP Z O O [PL]; UNIV WARSZAWSKI MEDYCZNY [PL]	Detergent-free decellularized extracellular matrix preparation method and biinks for 3D printing
CN112057750	HENGXIN ZENGCAI MANUFACTURING RES CENTER FOSHAN CO LTD	Tissue compensator for radiotherapy, and preparation method thereof
US2021069935	XEROX CORP [US]	Optical absorbing thermoplastic polymer particles and methods of production and uses thereof
WO2021030900	NAT RES COUNCIL CANADA [CA]	Fabrication of synchronous reluctance machines using additive manufacturing
CN112356438	UNIV XIAN POLYTECHNIC (CN)	Ethod for preparing 1+1 rib knitted fabric based on 3D printin
WO2021028240	SOLVAY SPECIALTY POLYMERS USA [US]; SOLVAY [BE]	Additive manufacturing process for making a three-dimensional object using selective laser sintering
WO2021018677	CENTRE NAT RECH SCIENT [FR]; UNIV D AIX MARSEILLE AMU [FR]; ECOLE CENTRALE MARSEILLE [FR]	Method for manufacturing a three-dimensional object or for modifying the surface state of a preformed object by photo-polymerisation
EP3771550	BOEING CO [US]	Plasma-treated powders for additive manufacturing
WO2021009508	JOHNSON MATTHEY PLC [GB]	Manufacture of three-dimensional objects by polymerisation additive layer manufacture techniques
FR3098741	CENTRE NAT RECH SCIENT [FR]	Manufacturing process of a part comprising aluminum
WO2020255443	BRIDGESTONE CORP [JP]	Rubber article manufacturing method
WO2020239982	ELKEM SILICONES FRANCE SAS [FR]	Additive manufacturing method for producing a silicone elastomer article
WO2020234096	SOLVAY SPECIALTY POLYMERS USA [US]	Additive manufacturing method for making a three-dimensional object
WO2020229197	COMMISSARIAT ENERGIE ATOMIQUE [FR]	Method for manufacturing an aluminium alloy part by additive manufacturing and aluminium alloy part obtained according to the method
JP2021037348	UNIV TOYAMA PREFECTURAL	Production method of cap for acquiring brain information and cap for acquiring brain information

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Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
CN112294499	JUST HUAJIAN MEDICAL DEVICE TIANJIN CO	Oxide-containing zirconium-niobium alloy zone trabecular bone femoral condyle prosthesis and preparation method
KR20210016150	KYUNGPOOK NAT UNIV IND ACADEMIC COOP FOUND [KR]	Material extrusion type for 3D printer and 3D model printing method
WO2021010990	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing with magnetic agents
JP2021003890	CANON KK	Photocurable resin composition for three-dimensional modeling and method for manufacturing articles
WO2021029311	KONICA MINOLTA INC [JP]	Resin composition, filamentous material, three-dimensional additively manufactured object, and method
KR20210008632	YOLILO INC [KR]	3D Powder-based food composition for 3D printer and manufacturing method thereof
CN112043676	GUANGDONG FOOD & DRUG VOCATIONAL COLLEGE	Three-dimensional printed loratadine oral disintegrating tablet as well as raw material composition and preparation method thereof
US2021032418	AIRTECH INT INC [US]	Adjustable cte polymer compositions for extrusion and additive manufacturing processes
JP2021024245	TOAGOSEI CO LTD	Modeling material, 3D model manufacturing method and model manufacturing method
JP2021016349	MEIJI CO LTD	3D Food and Manufacturing method of 3D molding material
CN112274701	UNIV SOUTH CHINA TECHNOLOGY (CN)	A photosensitive resin/ β -tricalcium phosphate composite biological ink that can be used for DLP printing and its preparation method
FR3099385	H E F [FR]	Metallic powder used for additive manufacturing process and Method of preparing
RU2738388	AUTONOMOUS NON PROFIT ORGANIZATION FOR HIGHER EDUCATION SKOLKOVO INSTITUTE OF SCIENCE AND TECH [RU]	Coaxial filament for 3D printer
WO2020251520	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing with pore-promoting agents

Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
WO2020251524	HEWLETT PACKARD DEVELOPMENT CO [US]	Materials for three-dimensional 3D printing and 3D printed article comprises powder bed including composite fibers with encapsulated polymer and fusing agent
WO2020251525	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing formulation including glass fiber
WO2020251532	HEWLETT PACKARD DEVELOPMENT CO [US]	Fluid kit for three-dimensional printing with fusing agent
JP2020193277	ASAHI KASEI CORP	Polyacetal powder and method of using the same, and additive manufacturing method
WO2020229782	ARKEMA FRANCE [FR]	Copolymer powder with polyamide blocks and polyether blocks

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Dispositivos



Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
ES1259719	DÍAZ CASTRO, MARIEL (ES); FERNÁNDEZ CAMERO, JOSÉ ANTONIO (ES);	Máquina y sistema de fabricación aditiva automatizado
ES1262888	GARCÍA RIVERO, JOSE MIGUEL	Sistema de triple guiado en dirección eje Z para impresores 3D cartesianas
ES2812826	UNIVERSITAT POL. DE CATALUNYA	Sistema de extrusión para una impresora 3D
EP3792039	TNO [NL]; CHEMELOT SCIENT PARTICIPATIONS B V [NL]	Dispensing head for continuous fiber reinforced fused filament type additive manufacturing
EP3789136	JEOL LTD [JP]	Additive manufacturing machine
US2021069973	SLICE ENG LLC [US]	Adaptable high-performance extrusion head for fused filament fabrication systems
WO2021040712	SIEMENS IND SOFTWARE INC [US]	Systems and methods for automatic detachment of support structures for 3D printed parts
WO2021037848	CIC CERAMIC INST CLAUSTHAL GMBH [DE]	3D screen printing facility and 3D screen printing method for producing a shaped article
EP3782801	LAYERWISE N V [BE]	Three-dimensional printing system with improved process chamber
WO2021040723	HEWLETT PACKARD DEVELOPMENT CO [US]	Pressure-regulating apparatus for three-dimensional printer
EP3771723	SHPP GLOBAL TECH B V [NL]	Additive manufacturing article and method
WO2021025876	CARBON INC [US]	Additive manufacturing apparatus with purged light engine
EP3771547	UNIV BERLIN TECH [DE]	Method for 3D printing of vascularized tissues and organs
WO2021025307	KOREA ADVANCED INST SCI & TECH [KR]	3D printer having microhole processing function, and method for processing microhole by using same
WO2021021083	GEN ELECTRIC [US]	Modular extrusion system for forming an article
WO2021020011	TECH RES ASSOCIATION FUTURE ADDITIVE MANUFACTURING [JP]; SHIBAURA MACHINE CO LTD [JP]	Nozzle, and additive fabrication device
WO2021015718	HEWLETT PACKARD DEVELOPMENT CO [US]	3D printed objects and enclosed container structures
WO2021013715	BIGREP GMBH [DE]	3D-printing housing nozzle
WO2021015745	HEWLETT PACKARD DEVELOPMENT CO [US]	Movement of a build unit in a 3D printer
WO2021013768	VITO NV [BE]	A method and system for printing a porous structure
WO2021010990	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing with magnetic agents
FR3098752	A3D LATELIER NUMERIQUE [FR]	Three-dimensional print device manufacture format component comprise extrude block equip add motor move axis two place mobile

Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
WO2021006864	HEWLETT PACKARD DEVELOPMENT CO [US]	Printing agent transfer for 2D and 3D printers
FR3098437	TOBECA [FR]	Additive manufacture equipment three dimension print comprise lift mechanism lower yoke carry base upper move translation respect
WO2021001019	SIEMENS AG [DE]	Device for detaching a 3D printed part, method for detaching and support structure
WO2021002277	CANON KK [JP]	Three-dimensional printing device and method of manufacturing three-dimensional printed object
WO2020260053	KRAFT FOODS SCHWEIZ HOLDING GMBH [CH]	Print head and method for 3D printing and products obtained therefrom
FR3097678	JEROME PRECHEUR CONSEILS [FR]	Installation device three-dimensional print medical place container produce module
EP3756796	HAMILTON SUNDSTRAND CORP [US]	Powder removal
WO2020255069	ROBOZE S P A [IT]	A cooled extruder, fixable to a printing carriage of a machine for quick prototyping with thread of filler material
US2020398489	THERMWOOD CORP [US]	Apparatus and methods for compressing material during additive manufacturing
WO2020257073	DENTSPLY SIRONA INC [US]	Additively manufactured denture base with bracing body
WO2020236610	EVOLVE ADDITIVE SOLUTIONS INC [US]; FARAH ZEITER [US]	Layer transfusion sequencing for selective deposition-based additive manufacturing
WO2020250464	MITSUBISHI HEAVY IND MACHINE TOOL CO LTD [JP]; TECH RES ASSOCIATION FUTURE ADDITIVE MANUFACTURING [JP]	Surface processing device and method, and 3D layering apparatus
WO2020250462	MITSUBISHI HEAVY IND MACHINE TOOL CO LTD [JP]; TECH RES ASSOCIATION FUTURE ADDITIVE MANUFACTURING [JP]	Three-dimensional layering device and method
EP3744507	HEWLETT PACKARD DEVELOPMENT CO [US]	Hybrid part-accessory connections
WO2020237138	GEN ELECTRIC [US]	Printing assemblies and methods for using the same
WO2020235650	KEIYO CHEMICAL CO LTD [JP]	Cleaning method, cleaning device, cleaning agent, and preliminary cleaning agent
EP3741543	LAYERWISE N V [BE]	Three-dimensional printing system with self-maintaining powder distribution subsystem
EP3736110	LAYERWISE NV [BE]	System for aligning laser system to a carrier plate
EP3736633	XEIKON PREPRESS N V [BE]	Apparatus and method for generating a 3D structure

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Productos



Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
ES2810949	VÁZQUEZ ALIJA, MARINA (ES); RAMÍREZ GÓMEZ, ÁLVARO (ES); ALIJA CASTRILLO, MARÍA LUISA (ES); GARCÍA GONZÁLEZ, CELSO (ES);	Dispositivo obstétrico y procedimiento de fabricación de dicho dispositivo obstétrico
DE102019005442	GROSSHAUS MIGUEL [DE]	Elastic biomimetic breast prosthesis
WO2020230997	T & R BIOFAB CO LTD [KR]; CATHOLIC UNIV KOREA IND ACADEMIC COOPERATION FOUNDATION [KR]	Implant for reconstruction of nipple-areola complex, and method for producing same
WO2021045183	HITACHI METALS LTD [JP]	Ni-based alloy, Ni-based alloy powder, Ni-based alloy member, and product provided with ni-based alloy member
CN112334539	UNIV HONG KONG POLYTECHNIC (CN)	3D printing antibacterial products
KR102212727	CHANGJO E&C CO LTD [KR]	Manufacturing method of the environment-friendly cement sculpture utilizing the recycled goods
CN111907163	CHANGZHOU BEIMEI HOUSEHOLD TECH CO LTD	3D printing PVC floor and production method and production line thereof
US2020385964	AS AMERICA INC [US]	Multi-channel plumbing products
CN111905145	MSEA NEW MATERIAL TECH GUAN CO LTD	Bioactive glass artificial bone and additive manufacturing method thereof
WO2020239777	RHEINISCH WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN RWTH [DE]	Wrist endoprosthesis
JP2021037234	IBIDEN CO LTD	Facial mask and method for producing a facial mask
KR102190778	UNIV INHA RES & BUSINESS FOUND [KR]	Tactile sense realizable structure
US2020378067	PROCTER & GAMBLE [US]	Deflection member and Methods of making a deflection member
CN112354017	INST BIOMEDICAL ENG CHINESE ACAD MEDICAL	3D printed mechanical bionic auricular cartilage tissue engineering scaffold and manufacturing method thereof
WO2021044258	NAT RES COUNCIL CANADA [CA]	3D Printed antenna
WO2021030693	ENTEK MFG LLC [US]	Additively manufactured extruder components
US2021030086	TOP GLOVE INT SDN BHD [MY]	Method of manufacturing a textured former and a glove made therefrom
WO2021032226	ING CORP SPOL S R O [CZ]	3D Printed prosthetic socket for residual limb

Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
CN112206358	SUZHOU NUOPU REGENERATIVE MEDICINE CO	A biological 3D printed skin repair scaffold
CN111939016	2ND AF HOSP KUNMING MED UNIV	Upper limb orthopedic rehabilitation accessory device based on 3D printing
CN111938648	NINGBO NO 6 HOSPITAL	3D printing magnetic resonance coil lining cavity support used for improving magnetic resonance imaging quality and preparation method
CN212590601	QUANZHOU PEAK SHOES CO LTD	3D printing running shoe with integrated shoe body with imitating knitted structure

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Procesamiento de Datos



Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
EP3736110	LAYERWISE NV [BE]	System for aligning laser system to a carrier plate
WO2021044899	EBARA CORP [JP]	Machine learning device, am device, machine learning method, and method for generating learning model
WO2021021198	HEWLETT PACKARD DEVELOPMENT CO [US]	Defined labels for 3D model label placeholders
WO2021021118	HEWLETT PACKARD DEVELOPMENT CO [US]	Optical assemblies
WO2021021110	HEWLETT PACKARD DEVELOPMENT CO [US]	Object geometry for three dimensional printers
WO2021020962	ULTIMAKER B V [NL]	Method of determining a local height of a build surface
WO2021021469	VELO3D INC [US]	Quality assurance in formation of three-dimensional objects
WO2021010963	HEWLETT PACKARD DEVELOPMENT CO [US]	Offset operators
WO2021010942	HEWLETT PACKARD DEVELOPMENT CO [US]	Geometrical transformations in additive manufacturing
WO2021010275	MIMAKI ENG CO LTD [JP]	Photographing apparatus for photogrammetry, shaping apparatus, shaped article set, three-dimensional data generation apparatus, and shaping system
WO2021006883	HEWLETT PACKARD DEVELOPMENT CO [US]	Generation of modified model data for three dimensional printers
WO2021003067	SAUDI ARABIAN OIL CO [SA]; ARAMCO SERVICES CO [US]	Fabrication of composite parts by additive manufacturing and microstructure topology optimization
EP3756792	SIEMENS AG [DE]	Method and assembly for separating excess material from a component produced using additive manufacture
WO2020102757	ALIGN TECHNOLOGY INC [US]	Machine based three-dimensional (3D) object defect detection
WO2020263239	HEWLETT PACKARD DEVELOPMENT CO [US]	Geometrical transformations in additive manufacturing
WO2020244872	SIEMENS MOBILITY GMBH [DE]	Interior angle formed by alternating printing techniques
WO2020226608	HEWLETT PACKARD DEVELOPMENT CO [US]	Agent composition determination based on thermal values
WO2021046076	VULCANFORMS INC [US]	Laser array position detection
WO2021038170	SAFRAN AIRCRAFT ENGINES [FR]	Laser melting additive manufacturing equipment with anti-turbulence shields
NL2023320	ROPAX HOLDING B V [NL]	Method for manufacturing a building and device for automated manufacturing of objects by means of 3D printing of a material.
EP3782802	DENTSPLY SIRONA INC [US]; SIRONA DENTAL SYSTEMS GMBH [DE]	Imposing quality requirements on 3D models with support structures

Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
WO2021026102	ORIGIN LABORATORIES INC [US]	Method and system for interlayer feedback control and failure detection in an additive manufacturing process
WO2021015728	HEWLETT PACKARD DEVELOPMENT CO [US]	3D printing
WO2021006873	HEWLETT PACKARD DEVELOPMENT CO [US]	Distributing print agents in additive manufacturing
WO2020234517	WESTLAKE COMPOUNDS HOLDING [FR]	System and process for selectively and locally treating the surface of parts, especially via deposition of material

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