

# VT

## PATENTES

# IMPRESIÓN 3D

3



Vigilancia  
Tecnológica  
3<sup>er</sup> trimestre 2020

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 testar nuevos diseños de productos, desarrolló una máquina de impresión 3D que conseguía realizar en pocos minutos procesos que por aquel entonces llevaban semanas.

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.

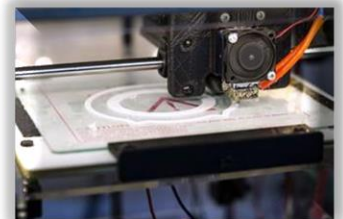
## Contenido



PROCESOS



MATERIALES



DISPOSITIVOS



EQUIPOS  
AUXILIARES



PROCESAMIENTO  
DE DATOS



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 del Boletín, se incluye una selección de las solicitudes de patentes publicadas a nivel mundial durante el segundo trimestre de 2020, distribuidas en cinco apartados: procesos,

materiales, dispositivos, equipos auxiliares 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
<a href="#">WO2020182510</a>	SIGNIFY HOLDING BV [NL]	3D printed optics
<a href="#">US2016023403</a>	MASSACHUSETTS INST TECHNOLOGY [US]	Systems and methods of machine vision assisted additive fabrication systems and methods of machine vision assisted additive fabrication
<a href="#">WO2020174065</a>	VALEO MATERIAUX DE FRICTION [FR]	Method for additive manufacturing of a friction lining
<a href="#">EP3705265</a>	XYZPRINTING INC [TW]; KINPO ELECT INC [TW]	Feeding control system of 3D printer and feeding control method thereof
<a href="#">US2020282649</a>	FOUND RES & BUSINESS SEOUL NAT UNIV SCI & TECH [KR]	Four-dimensional printing method using thermal anisotropy and thermal transformation, and the resulting product
<a href="#">US2020269507</a>	OHMNILABS INC [US]	Automatic filament changer
<a href="#">US10751951</a>	NGUYEN TAI DUNG [US]; NGUYEN TUE [US]	3D printed materials, structures and processes
<a href="#">KR20200080423</a>	KOREA ELECTRONICS TECHNOLOGY [KR]	3D method of manufacturing functional parts using 3D printing
<a href="#">WO2020144135</a>	SIGNIFY HOLDING BV [NL]	Drip printing
<a href="#">DE102018009748</a>	PARTHY KAI [DE]	Process and 3D printer for additional stiffening of 3D printed objects built up in layers using stiffening elements
<a href="#">EP3666500</a>	CANON PRODUCTION PRINTING HOLDING B V [NL]	A method of 3D ink jet printing

Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
CN111516263	(SUZH-N) SUZHOU POLLYPOLYMER NEW MATERIAL TECHNOL	Printing method for digital light processing-type 3D printer
CN111497233	(SHEN-N) SHENZHEN CHENGYI TECHNOLOGY CO LTD	A bi-material 3D printing molding method
CN111471641	(UYDG ) UNIV DONGHUA	3D printing manufacturing method of multi-layer unit hydrogel-coated bionic capillary network
CN111452350	(LAIQ-I) LAI Q	A multifunctional medical goggles facial contour fitting design and 3D printing method
WO2020154713	CONTINUOUS COMPOSITES INC [US]	System for additively manufacturing composite structure
CN111361145	UNIV SOUTH CHINA TECH; BUMINGTE FOSHAN PHOTOELECTRIC TECH CO LTD	Surface-exposure-based multi-degree-of-freedom 3D printing method, device and system
CN111331836	UNIV JILIN	Preparation method for temperature response type 4D printing intelligent hydrogel material
CN111319254	SHANGHAI COIN ROBOT TECH CO LTD	Method for improving compactness of 3D printing corner
CN111284000	UNIV TSINGHUA; SHANGHAI SUNP BIO TECH BEIJING CO LTD	Biological 3D printing based medicine carrying cardiac valve and manufacturing method thereof
WO2020169423	BASELL POLYOLEFINE GMBH [DE]; ALBERT-LUDWIGS-UNIVERSITÄT FREIBURG [DE]	Extrusion additive manufacturing process for producing polyethylene articles
WO2020167633	PPG IND OHIO INC [US]	3D printing of seal caps
EP3698945	RICOH CO LTD [JP]	Solid freeform fabrication object, method of manufacturing solid freeform fabrication object, liquid set for solid freeform fabrication, and device for manufacturing solid freeform fabrication object
WO2020127882	ELKEM SILICONES FRANCE SAS [FR]	Method for the additive manufacturing of a silicone elastomer article
US2020262135	INTREPID AUTOMATION [US]	Closed loop print process adjustment based on real time feedback
WO2020117490	CARBON INC [US]	Window thermal profile calibration in additive manufacturing

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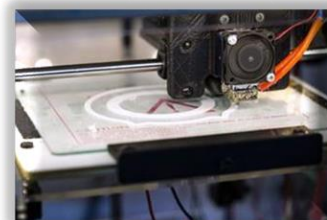


Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
FR3092519	ARKEMA FRANCE [FR]	Salified monomer powder and their use in powder agglomeration processes
WO2020131112	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing
CN111421812	(NING-N) NINGXIA BINGHE TECHNOLOGY CO LTD	Rapid prototyping process for unmanned aerial vehicle silo
US2020290269	GM GLOBAL TECH OPERATIONS LLC [US]	Composite fusion filament
CN111574813	(UNJF ) UNIV NANJING FORESTR	A polylactic acid-based biomass composite material and its 3D printing molding
CN111454614	(USWZ ) UNIV SOOCHOW	3D bioprinting ink and its preparation method and application
JP2020111867	(SHIE ) SHINETSU CHEM IND CO LTD	Phosphor-containing thermoplastic resin filament
JP2020121431	(HITM ) MAXELL HOLDINGS LTD	Model material clear composition
CN111473671	(FUJI-N) FUJIAN YONGAN YONGTSING GRAPHENES INST	Graphene vc soaking plate and preparation method thereof
US2020247013	HEXCEL CORP [US]	Polymer powder and method of preparing the same
JP2020116788	(TACA ) TAICA CORP	Composition for hot melt laminated three-dimensional printer
EP3680263	BASF SE [DE]; ALBERT LUDWIGS UNIV FREIBURG [DE]	Limonene-based (meth)acrylates for use in 3D printing
CN111330086	GUANGDONG PROVINCE TRADITIONAL CHINESE MEDICAL HOSPITAL THE SECOND AFFILIATED HOSPITAL OF GUANGZHOU	Bionic artificial bone scaffold material and preparation method thereof
CN111320767	UNIV SOUTHWEST JIAOTONG	Preparation method of thixotropic hydrogel for 3D biological printing
WO2020141329	VICTREX MFG LIMITED [GB]	Polymeric material, manufacture and use
WO2020141521	STRATASYS LTD [IL]	Additive manufacturing using materials that form a weak gel
WO2020136919	OKAMOTO CHEMICAL IND CO LTD [JP]	Composition for optical three-dimensional shaping, three-dimensionally shaped article, and method for producing same

Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
<a href="#">KR20200071816</a>	LOTTE CHEMICAL CORP [KR]	3D printing polylactic acid filament composition for improving surface property and filament for 3-dimension printer using the same
<a href="#">WO2020136656</a>	YEDA RES & DEV [IL]; UNIV RAMOT [IL]	Nanocomposites comprising biodegradable polymers and inorganic nanoparticles, methods of preparation and uses thereof
<a href="#">EP3677697</a>	SIEMENS AG [DE]	Co-alloy for additive manufacturing and method
<a href="#">WO2020127634</a>	COVESTRO INTELLECTUAL PROPERTY GMBH & CO KG [DE]	Powder coating method for manufacturing 3D-printed components having improved mechanical properties
<a href="#">WO2020127655</a>	HUNTSMAN INT LLC [US]	Cross-linkable thermoplastic powder for powder based additive manufacturing

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# Dispositivos



Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
ES1250194	FUNDACION UNIVERSITARIA SAN ANTONIO (100.0%) (ES)	Printer with rigid fused bars, way to produce the bars, formulations of them and uses of the system
US2020247052	SILICON LIGHT MACHINES CORP [US]	Stacked PLV Driver Architecture for a Microelectromechanical System Spatial Light Modulator
JP202011684	(RICO ) RICOH KK	Modeling apparatus, system, method and program
GB2580194	REM3DY HEALTH LTD [GB]	3D printer
CN111361149	GUIZHOU SENYUAN ZENGCAI MANUFACTURE TECH CO LTD	Soaking fault-prevention selective laser sintering device and manufacturing method thereof
CN111331841	HENGTONG XIJIAO INTELLIGENT MACHINE GUANGDONG CO LTD	Dual light path light-curing 3D printing equipment and printing method thereof
US2020290119	UNIV LELAND STANFORD JUNIOR [US]	Field shaping device for radiation therapy
US10759089	MADE IN SPACE INC [US]	Recycling materials in various environments including reduced gravity environments
EP3680090	LINCOSOLUTION CO LTD [KR]	Three-dimensional (3D) printer including floating solution for reducing resin usage
US2020290276	UT BATTELLE LLC [US]; MAGNUM VENUS PRODUCTS INC [US]	Increased material flow throughput in large scale additive manufacturing through movable segmented build platform
WO2020178220	SLM SOLUTIONS GROUP AG [DE]	Device and method for producing a three-dimensional workpiece
WO2020175001	SONY CORP [JP]	3D printer device, three-dimensional structure manufacturing method, and three-dimensional structure
WO2020170058	SADRI SAYED MOHAMMAD MEHDI [IR]	Parallel axis with plate printer (P.A.P printer)
EP3693153	CL SCHUTZRECHTSVERWALTUNGS GMBH [DE]	Application unit
US2020262150	GEN ELECTRIC [US]	Method and apparatus for layer thickness control in additive manufacturing
WO2020163009	THE BOARD OF REGENTS OF THE NEVADA SYSTEM OF HIGHER EDUCATION ON BEHALF OF THE UNIV OF NEVADA LAS VE [US]	Modular expandable 3D printer
US2020254689	ESSENTIUM INC [US]	Infrared heating of additive printed part
US2020254690	ESSENTIUM INC [US]	Filament buffer

Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
WO2020159489	HEWLETT-PACKARD DEV COMPANY LP [US]	Creating a print job using user-specified build material layer thicknesses
DE102019102296	EOS GMBH ELECTRO OPTICAL SYSTEMS [DE]	System with a 3D printing device
US2020246119	SMILEDIRECTCLUB LLC [US]	Systems and methods for marking models for dental aligner fabrication
JP2017001393	HIT DEVICES LTD	Modeling material ejection head and modeling method
US2020238624	GEN ELECTRIC [US]	Method and apparatus for process monitoring in additive manufacturing
US2020231841	CARBON INC [US]	Methods for producing footwear with materials having multiple mechanisms of hardening
WO2020141822	RYUJIN LAB INC [KR]	3D printer and printing system
US2020206817	LAYERWISE NV [BE]	Three-dimensional printing system optimizing contour formation for multiple energy beams
FR3089448	ADDUP [FR]	Additive manufacturing machine with a compact layout guide device

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# Equipos Auxiliares



Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
US2020282649	FOUND RES & BUSINESS SEOUL NAT UNIV SCI & TECH [KR]	Four-Dimensional Printing Method Using Thermal Anisotropy and Thermal Transformation, and the Resulting Product
WO2020169688	LUXEXCEL HOLDING BV [NL]	Method for printing a three-dimensional optical component
EP3693107	RENISHAW PLC [GB]	Powder bed fusion apparatus and methods
US2015209978	MADE IN SPACE INC [US]	Recycling Materials In Various Environments Including Reduced Gravity Environments Recycling materials in various environments including reduced gravity environments
KR20200094851	KIM HYUN SEOK [KR]	3D surface post-processing machine of 3D printer output
KR20200084954	DAEGUN TECH CO LTD [KR]	3D Powder supply system for 3D printer
WO2020152587	3M INNOVATIVE PROPERTIES CO [US]	A device for spinning a workpiece
WO2020159507	HEWLETT-PACKARD DEV COMPANY LP [US]	Liquid extraction
EP3689968	SABIC GLOBAL TECHNOLOGIES BV [NL]	Method of separating a copolycarbonate-based support structure from an additively manufactured article
US2019047008	GEN ELECTRIC [US]	Cleaning fixtures and methods of cleaning components using cleaning fixtures
WO2020127882	ELKEM SILICONES FRANCE SAS [FR]	Method for the additive manufacturing of a silicone elastomer article
US2020230879	MIMAKI ENG CO LTD [JP]	Three-dimensional shaping device and manufacturing method for three-dimensional shaped object
WO2020138617	KOREA INST MACH & MATERIALS [KR]	Apparatus for washing 3D printing structure and method for washing 3D printing structure using same
US2018099300	XEROX CORP [US]	System and method for finishing the surface of three-dimensional (3D) objects formed by additive manufacturing systems
EP3680090	LINCOSOLUTION CO LTD [KR]	Three-dimensional (3D) printer including floating solution for reducing resin usage



Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
DE102019100416	DEUTSCH ZENTR LUFT & RAUMFAHRT [DE]	Device for generative production of three-dimensional object, has control unit which detects fire inside chamber by fire sensor, and extinguishing device that introduces extinguishing medium into chamber
WO2020131112	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing
EP3670150	CONCEPT LASER GMBH [DE]	Build material handling unit for a powder module for an apparatus for additively manufacturing three-dimensional objects
FR3089436	ADDUP [FR]	Method for cleaning a workpiece by using immersion, solidification and vibration process through additive manufacturing, involves using a cleaning product which can take liquid, solid, and gaseous states with reversibly passing powder
WO2020176487	CARBON INC [US]	Resin level detection in additive manufacturing
WO2019083959	FORMLABS INC [US]	Techniques for debris removal in stereolithography and related systems and methods
WO2020160214	DIGITAL ALLOYS INCORPORATED [US]	Systems and methods for three-dimensional printing
EP3158400	CARBON INC [US]	Methods of producing three-dimensional objects from materials having multiple mechanisms of hardening
WO2020133310	UNIV BEIJING TECHNOLOGY [CN]	3D printing method employing adaptive internal support structure
US2020189190	3D SYSTEMS INC [US]	Precision optical assembly for three dimensional printing

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# Procesamiento de Datos



Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
EP3194145	MASSACHUSETTS INST TECHNOLOGY [US]	Systems and methods of machine vision assisted additive fabrication
EP3705212	ARCAM AB [SE]	Additive manufacturing of three-dimensional articles
US2018281302	XEROX CORP [US]	Cure confirmation system and method for three dimensional object printer
WO2020179114	MITSUBISHI HEAVY IND LTD [JP]	Calibration member for laminate molding device, laminate molding device, and laminate molding method
EP3698947	SIEMENS AG [DE]	Monitoring and process control of an additive production of a workpiece
EP3708369	DENTSPLY SIRONA INC [US]; SIRONA DENTAL SYSTEMS GMBH [DE]	Stereolithography apparatus having a detection unit for optical adjustment and image modification
WO2020005717	INTREPID AUTOMATION [US]	Closed loop print process adjustment based on real time feedback
WO2020159489	HEWLETT-PACKARD DEV COMPANY LP [US]	Creating a print job using user-specified build material layer thicknesses
US2020238624	GEN ELECTRIC [US]	Method and apparatus for process monitoring in additive manufacturing
WO2018119085	GEN ELECTRIC [US]	Methods and systems for implementing distributed ledger manufacturing history
EP3431264	CL SCHUTZRECHTSVERWALTUNGS GMBH [DE]	Apparatus for additively manufacturing three-dimensional objects
WO2020145997	HEWLETT PACKARD DEVELOPMENT CO [US]	Dimensional compensations for additive manufacturing
WO2020141822	RYUJIN LAB INC [KR]	3D printer and printing system
WO2020142156	3D SYSTEMS INC [US]	System and method for repairing a three-dimensional article
US2020215761	INKBIT LLC [US]	Reconstruction of surfaces for additive manufacturing
WO2020136518	BESIM BULENT [AU]; WEATHERLY STEPHEN [US]	System to enable folding in an additive manufacturing machine
WO2017210254	NIKE INNOVATE CV [US]; NIKE INC [US]	Gradient printing a three-dimensional structural component

Nº PUBLICACIÓN	SOLICITANTE Y PAIS DE ORIGEN	CONTENIDO TÉCNICO
<a href="#">WO2020139526</a>	LAYERWISE NV [BE]	Three-dimensional printing system optimizing contour formation for multiple energy beams
<a href="#">WO2020128299</a>	COMMISSARIAT ENERGIE ATOMIQUE [FR]	Predicting the shape of a three-dimensional object which is subjected to a diffusion process
<a href="#">WO2020131830</a>	JABIL INC [US]	Apparatus, system and method for kinematic-based heating of an additive manufacturing print filament
<a href="#">WO2020132052</a>	JABIL INC [US]	Leveler for 3D printing build plate thermal expansion
<a href="#">WO2020129560</a>	KOBE STEEL LTD [JP]	Method for setting excess thickness, device for setting excess thickness, method for producing shaped object, and program
<a href="#">WO2020115997</a>	mitsubishi heavy ind ltd [JP]	Lamination system for laminate and lamination method for laminate

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