

VT

PATENTES

IMPRESIÓN 3D

2



Vigilancia
Tecnológica
2º 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.

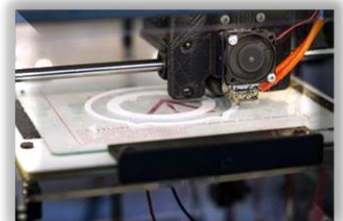
Contenido



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 PAÍS DE ORIGEN	CONTENIDO TÉCNICO
CN111216356	(QUAN-N) QUANZHOU PEAK SHOES CO LTD	Method for manufacturing 3D printed garment fabric and ready-made garment
DE102019130131	OPEN BIONICS LTD [GB]	Improvements in or regarding additive manufacturing
WO2020096787	EASTMAN KODAK CO [US]	Electrophotography-based 3D printing with improved layer uniformity
CN111086204	(SHEN-N) SHENZHEN CONE TECHNOLOGY CO LTD	3D printing method mixing modified carbon nanotube filaments with molten resin
EP3650200	PRODWAYS [FR]	Method and devices for quick detection and calibration of a 3D printer using a viscous material
WO2020087048	MAKE COMPOSITES INC [US]	Systems and methods of printing with fiber-reinforced materials
EP3640013	3D GENCE SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA [PL]	Method for manufacturing spatial objects
WO2020076734	KERACEL INC [US]	Three-dimensional, additive manufacturing system, and a method of manufacturing a three-dimensional object
CN110920050	TSINGHUA BERKELEY SHENZHEN INST PREPARATION OFFICE	3D printing method, system and product
FR3086567	NORIMAT [FR]	Method for producing counterform and method for manufacturing complex shape part using such a counterform

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
EP3628468	REBUILD SP Z O O [PL]	Device and method for the creating of supports, formworks, or structures made of foamed plastics, as well as device and method for the creating of constructions
US2020086553	ALIGN TECHNOLOGY INC [US]	Hybrid 3D printing with photo-curable materials
KR20200023698	(A) PARK SUNG JAI [KR]	(A B1) FDM 3D, 3D hull bending template production system based on FDM
EP3623136	FRAUNHOFER GES FORSCHUNG [DE]	Method for producing three-dimensional hydrogel structures and device for the layerwise building-up of such hydrogel structures
CN110834410	UNIV SOUTHERN MEDICAL	Method for PDMS complex three-dimensional structure forming based on 3D printing
EP3639952	GEN ELECTRIC [US]	Additive manufacturing systems and methods including louvered particulate containment wall
US2020086568	INTREPID AUTOMATION [US]	Additive manufactured parts with smooth surface finishes
CN111111800	(UYQI) UNIV TSINGHUA	Preparation method and sensor of flexible micro-channel
WO2020091773	HEWLETT PACKARD DEVELOPMENT CO [US]	Sinterable setter with interface layer
WO2020075173	UNIV RAMOT [IL]	Meniscus-confined three-dimensional electrodeposition
US2020101714	XEROX CORP [US]	Method for missing ejector compensation in three-dimensional object printing
US2020101713	MIMAKI ENG CO LTD [JP]	Method for forming 3D object
EP3627255	XYZPRINTING INC [TW]; KINPO ELECT INC [TW]	Method for detecting object border of 3D printer
US2020166879	BOSCH GMBH ROBERT [DE]	Method for producing a component and manufacturing device
EP3659786	HAMILTON SUNDSTRAND CORP [US]	Platform drop sensor
DE102018127931	DEUTSCH ZENTR LUFT & RAUMFAHRT [DE]	Process and plant for producing a three-dimensional structure
US2020147869	AIRBUS OPERATIONS LTD [GB]	Detection of contaminant in additive manufacturing

VOLVER A
CONTENIDO



Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
ES1245650	OÑATE MOLINA, ENRIQUE (ES)	Filamento antibacteriano, repelente de insectos y aromatizado para impresoras 3D
ES1247334	ACEVEDO SERRANO, MANUEL (ES); ROYANO BARROSO, LUIS (ES); PARRALEJO ALCOBENDAS, ANA (ES); CABANILLAS PATILLA, JUAN (ES); GÓNZALEZ CORTÉS, JERONIMO (ES)	Material termoplástico compuesto de matriz polimérica y fibras vegetales
ES1248574	UNIVERSIDADE DE VIGO (ES)	Filamentos para impresión 3D que comprenden biocerámica de origen marino
KR20200053665	UNIV KEIMYUNG IACF [KR]	3D Device and method for manufacturing multi-layer bio-scaffold using 3D printing
EP3659785	RICOH CO LTD [JP]	Powder for forming three-dimensional object, forming device, forming method, and powder
JP2020093515	(RICO) RICOH KK	Powder for 3D printing comprising thermoplastic resin particles, and filling material including silicon dioxide
US2020157265	GANAPATHIAPPAN SIVAPACKIA [US]; VORA ANKIT [US]; FU BOYI [US]	Low viscosity UV-curable formulation for 3D printing
US2020156309	WISCONSIN ALUMNI RES FOUND [US]	3D structures and methods therefor
WO2020086081	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing
CN111004491	YANG Q; YU J	Composition for 3D inkjet printing support structure and preparation method thereof
CN111055494	(BEIT) BEIJING INST TECHNOLOGY	Continuous fiber reinforced composite material 3D printer
WO2020086074	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing
WO2020086076	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing
CN110981463	(DIQI-N) DIQIYUANSU BEIJING NEW MATERIAL TECHNOLO	A photo-curing bioceramic composite material for 3D printing and its application and printing system
WO2020076724	SAUDI ARABIAN OIL CO [SA]; RICE UNIV [US]; ARAMCO SERVICES CO [US]	Cement-based direct ink for 3D printing of complex architected structures
WO2020074332	SOLVAY SPECIALTY POLYMERS USA [US]; VIRGINIA TECH INTELLECTUAL PROPERTIES INC [US]	Photocurable polymers, photocurable polymer compositions and lithographic processes including the same
EP3632941	CUBICURE GMBH [AT]	Resin composition
WO2020060555	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing
WO2020060572	HEWLETT PACKARD DEVELOPMENT CO [US]	Three-dimensional printing
JP2020044763	SUMITOMO RUBBER IND	Rubber composition for three-dimensional additive manufacturing

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
US2017268133	(A1 B2) STRATASYS INC [US]	(A1) ore-shell morphology of composite filaments for use in extrusion-based additive manufacturing systems (B2) Core-shell morphology of composite filaments for use in extrusion-based additive manufacturing systems
DE102018130962	EOS GMBH [DE]	Method of providing a particulate material
US2020172748	3D SYSTEMS INCORPORATED [US]	Inks for 3D printing having low polymerization shrinkage
CN111068105	(SDSJ) UNIV SHANDONG JIANZHU	Porous artificial cartilage with biological activity based on 3D printing
ES1245650	ONATE MOLINA ENRIQUE [ES]; ALONSO PEREZ PEDRO MARIA [ES]	Antibacterial, insect repellent and flavored filament for 3D printers (Machine-translation by Google Translate, not legally binding)
CN111113889	(UYTJ) UNIV TONGJI	Fused deposition molding method using cored wire
CN111086208	(QILU-N) QILU INST TECHNOLOGY	Manufacturing method of polymer antibacterial material
CN111086210	HUANG C; LI F; LI R; LIU Z; SUN S; WANG X; WANG Y; ZHU Y	3D printing-based network multi-layer structure composite material processing equipment and method
CN110903099	SHANGHAI INST CERAMICS CAS	Porous body formed by directionally-arranged one-dimensional nanometer material, and preparation method thereof
KR200491716	(THRE-N) 3D CONTROLS CO LTD	3D cartridge for three dimensional printer supplying stick-type metal and ceramic material
DE102018220522	BBW HOCHSCHULE [DE]	Mixture of materials and method for producing three-dimensional shaped bodies
DE102018130005	FLOWTEC AG [CH]	UV-curing material, printed circuit board and method for the selective coating of a printed circuit board
US2020157258	CANON KK [JP]	Photocurable material composition and cured product thereof
CN111070673	(UGTE) UNIV GUANGDONG TECHNOLOGY	Method for 3D printing polymer in condensed state
JP6690040	(TKYO) TOKYO INK KK	Resin molding material for three-dimensional modeling device and filament for three-dimensional modeling device
CN111004499	(WUHT) WUHAN INST TECHNOLOGY	Nylon 12 wire material for 3D printing, preparation method and application thereof
US2020122140	BRIGHAM & WOMENS HOSPITAL INC [US]	Microfluidics-enabled multimaterial stereolithographic printing
US2020109299	L LIVERMORE NAT SECURITY LLC [US]	Bio-ink structures and methods of producing the same
WO2020051039	DOW SILICONES CORP [US]	Low viscosity compositions and 3D printing methods utilizing the compositions

VOLVER A
CONTENIDO

Dispositivos



Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
ES1246114 U	MARTI ESPARZA, MARIA (ES)	Dispositivo doméstico multifunción para corte, impresión 3D y estampado de material textil y celulósico reciclado
ES2760148	TRIDITIVE, S.L. (ES)	Máquina y sistema de fabricación aditiva automatizado
KR20200056703	HANBAT NATIONAL UNIV INDUSTRY ACADEMIC COOPERATION FOUNDATION [KR]	3D printing apparatus and method for adjusting possible spot size and area segmentation of freeform segments
CN111168995	(SHEN-N) SHENZHEN MOFANG NEW MATERIAL TECHNOLOGY	Film-coated multi-material photo-curing 3D printing equipment and its use method
US2020147689	LAYERWISE NV [BE]	Alternating Dual Layer Contouring and Hatching for Three-Dimensional Manufacturing
US2020094469	PHOTOCENTRIC LTD [GB]	Method of Automating the Manufacture of 3D Printed Objects
WO2020116946	LG CHEMICAL LTD [KR]	Ejection apparatus, molding apparatus, and method for manufacturing molded body
JP2020084196	(JTEK) JTEKT CORP	Additional manufacturing apparatus and additional manufacturing method
KR20200057840	HANBAT NATIONAL UNIV INDUSTRY ACADEMIC COOPERATION FOUNDATION [KR]	3D Hybrid binder jet 3D printing apparatus and method for making possible of freeform architecture using different viscosity
DE102018128582	SCHMUTZ HELMUT [AT]	Additive manufacturing apparatus for article with print heads
US2020156316	CONTINUOUS COMPOSITES INC [US]	System for additive manufacturing
WO2020093087	EFFUSIONTECH PTY LTD [AU]	A method of 3D printing
DE102018128242	SLM SOLUTIONS GROUP AG [DE]	Powder application device, method for operating a powder application device and system
US2020139630	ORIGIN LABORATORIES INC [US]	System for window separation in an additive manufacturing process
WO2020088832	NEOTECH AMT GMBH [DE]	Device for simultaneous 3D printing of a plurality of objects
WO2020095453	MITSUBISHI ELECTRIC CORP [JP]	Layering/molding device
WO2020091744	HEWLETT PACKARD DEVELOPMENT CO [US]	Feedback control of microwave energy emitters
DE102018127451	BAYERISCHE MOTOREN WERKE AG [DE]	Device and method for additive manufacturing of a component
KR102106102	QUVE CO LTD [KR]	3D over-printing device and method
EP3646969	TOSHIBA MACHINE CO LTD [JP]	Additive manufacturing apparatus, additive manufacturing method, and computer program product
US2020139623	3DTECH OY [FI]	Modular systems and methods for performing additive manufacturing of objects
EP3643434	CL SCHUTZRECHTSVERWALTUNGS GMBH [DE]	Unpacking station

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
EP3644010	CONCEPT LASER GMBH [DE]	Determination device for determining at least one parameter of an energy beam
US2020122407	SEIKO EPSON CORP [JP]	Three-dimensional shaping system and data generation apparatus
WO2020076343	HEWLETT PACKARD DEVELOPMENT CO [US]	Baffles to absorb reflected energy in reflectors
WO2020070136	DENTSPLY SIRONA INC [US]; SIRONA DENTAL SYSTEMS GMBH [DE]	Deformation detection of troughs
EP3632594	GEN ELECTRIC [US]	Coater apparatus and method for additive manufacturing
EP3632592	UNITED GRINDING GROUP MAN AG [CH]	Additive manufacturing system
US2020101662	HU DONGMING [US]	Hybrid manufacturing apparatus
DE102018123254	MUEHLBAUER TECH GMBH [DE]	3D printer
JP2020044772	FUJI XEROX CO LTD	Molding apparatus
DE102018216149	FRAUNHOFER GES FORSCHUNG [DE]	Device for influencing the volume flow of extruded plastically deformable material
US2020079024	IND TECH RES INST [TW]	Biomaterial printing apparatus
WO2020053567	RENISHAW PLC [GB]	Powder bed fusion apparatus and methods

VOLVER A
CONTENIDO

Equipos Auxiliares



Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
ES1243310	GARCIA SERRANO SIXTO [ES]	Dispositivo para empalmar filamentos de impresoras 3D
KR102120205	CONCEPTION CO LTD	3D Vacuum injection 3D printer for forming heat dissipation parts
WO2020120891	ADDUP [FR]	Method for cleaning a part produced by an additive manufacturing method with at least one plug and a phase change of a cleaning product
WO2020110935	KAO CORP [JP]	Three-dimensional object precursor treatment agent composition
JP2020082670	RICOH KK	Modeling apparatus
US2020165555	RES TRIANGLE INST [US]	Method and apparatus for spatial control of cellular growth
KR102084893	SNT [KR]	3D printer having powder cleaner
KR200491716	3D CONTROLS CO LTD	3D cartridge for three dimensional printer supplying stick-type metal and ceramic material
US2020164590	BOEING CO [US]	Pre-fabricated supports, a system for additive manufacturing a three-dimensional object, and a related method
WO2020104202	AMCM GMBH [DE]	Radial flow over a construction area
DE102018009041	SOLUKON INGENIEURE GBR VERTRETUNGSBERECHTIGTE GES ANDREAS HARTMANN 86391 STADTBERGEN UND DOMINIK SCH [DE]	Cleaning 3D objects in cleaning device comprises clamping objects
DE102018219345	JAKSCHIK CHRISTIAN [DE]; ULT AG [DE]	Device for separating pollutants or particles from process exhaust gas stream comprises filter element arranged in chamber, metering device for powdery additive or powdery additive arranged upstream of filter element and storage container

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
JP2020075410	KEIYO CHEM CO LTD	Removal method for high molecular compound from workpiece, involves immersing workpiece to which high molecular compound adhered with respect to first liquid, and high molecular compound and first liquid in immersion tank are isolated
DE102018219096	FORD GLOBAL TECH LLC [US]	Three dimensional printer used for three dimensional printing of objects, has support pins which are arranged on construction platform at spacing from one another and individually in longitudinal directions transversely to work surface
WO2020093038	HUGHES RUSSELL V [US]	System for purging air
WO2020089303	EXTRUDE HONE GMBH [DE]	Method for removing a support structure and tool therefor
US2016068678	LUO XIAOFAN [CN]; PEI ZHAOKUN [CN]; YIN HAIQING [CN]; JF POLYMERS SUZHOU CO LTD [CN]	Polymeric composition for use as a temporary support material in extrusion based additive manufacturing
EP3639952	GEN ELECTRIC [US]	Additive manufacturing systems and methods including louvered particulate containment wall
DE102018125263	VOLKSWAGEN AG [DE]	Cleaning component produced in a powder bed using the action of kinetic energy from linear tools
EP3632655	UNIV CATALUNYA POLITECNICA [ES]	3D printing machine and method
EP3674517	UNITED TECHNOLOGIES CORP [US]	Kinetic disassembly of support structure system for additively manufactured rotating components
US2017326643	(A1 B2) HONEYWELL FEDERAL MANUFACTURING & TECH LLC [US]	(A1) Lifting and removal device for additive manufacturing system (B2) Lifting and removal device for additive manufacturing system
WO2020068133	HEWLETT PACKARD DEVELOPMENT CO [US]	Break away support for 3D printing
WO2020065653	STRATASYS LTD [IL]	Method and system for additive manufacturing with a sacrificial structure for easy removal
WO2020046318	HEWLETT PACKARD DEVELOPMENT CO [US]	Additive manufacturing device with mating interface
WO2020053535	CENTRE TECHN IND MECANIQUE [FR]	Improved additive manufacturing facility

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
WO2020055754	INTREPID AUTOMATION [US]	Additive manufactured parts with smooth surface finishes
WO2020056300	MAKERBOT IND LLC [US]	Three-dimensional printing devices, systems, and methods
WO2020102260	PRELLIS BIOLOGICS INC [US]	Compositions and methods for printing three-dimensional structures corresponding to biological material
WO2020076734	KERACEL INC [US]	Three-dimensional, additive manufacturing system, and a method of manufacturing a three-dimensional object

VOLVER A
CONTENIDO

Procesamiento de Datos



Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
KR20200057841	HANBAT NATIONAL UNIV INDUSTRY ACADEMIC COOPERATION FOUNDATION [KR]	4D printing apparatus and method for making possible of freeform structure using rotate build plate
WO2020099852	RENISHAW PLC [GB]	Method of identifying anomalous events in additive manufacturing
WO2020081098	HEWLETT PACKARD DEVELOPMENT CO [US]	Selecting a depowdering process for 3D printing
US2020174450	MIMAKI ENG CO LTD [JP]	Information processing device for shaping device, shaping data combining method, and shaping data combining program
JP2020069700	CANON KK	Three-dimensional modeling apparatus E.G. Three-dimensional printer for manufacturing three-dimensional molded article, has control unit that controls supply unit so that information formed by support material is covered by model material
US2020108561	30 SYSTEMS INC [US]	Defining Lattice Support for Challenging Shell Geometries in a Three-Dimensional Printing System
JP2020093493	MIMAKI ENG KK	Modeling system for modeling three-dimensional molded article, has control apparatus that computes and memorizes performance value of time actually taken to form modeled object, and displays memorized performance value on monitor
US2020189183	L LIVERMORE NAT SECURITY LLC [US]	Controlling am spatter and conduction
US2018126475	FLEX LTD [SG]	Wave solder pallets for optimal solder flow and methods of manufacturing
KR20200057842	HANBAT NATIONAL UNIV INDUSTRY ACADEMIC COOPERATION FOUNDATION [KR]	R2R Shearing coating method for controlling provide another ink using dispenser
KR20200064750	LIM Y C	3D color flatbed 3D printer equipment
JP2020082432	CANON KK	Modeling apparatus for modeling three-dimensional object, has control unit that sets forming operation by plate-shaped member or provided with rotating structure based on information acquired by acquisition unit
JP2020082549	RICOH KK	Three-dimensional object forming apparatus E.G. Three-dimensional printer, has warning display control unit that performs control for warning or display regarding formation of three-dimensional object based on result of simulation
WO2020099402	ACONITY GMBH [DE]	Improved calibration method for a system for powder bed-based generating of three-dimensional components by means of electromagnetic radiation

Nº PUBLICACIÓN	SOLICITANTE Y PAÍS DE ORIGEN	CONTENIDO TÉCNICO
WO2020102757	ALIGN TECHNOLOGY INC [US]	Machine based three-dimensional (3D) object defect detection
US2020156323	AREVO INC [US]	Systems and methods for optimization of design and tool paths for additive manufacturing
KR20200046920	DENTIS CO LTD [KR]	3D Method for controlling plural projector type 3D three dimensional printer
EP3194145	(A2 A4) MASSACHUSETTS INST TECHNOLOGY [US]	(A2 A4) systems and methods of machine vision assisted additive fabrication
KR20200043808	SONG HOON HWA [KR]	File conversion method for multidimensional printing of points of interest
KR20200046165	DENTIS CO LTD [KR]	3D Image processing method for compensating error in output of 3-dimensional printer
US2020147689	LAYERWISE NV [BE]	Alternating Dual Layer Contouring and Hatching for Three-Dimensional Manufacturing
US2020139631	VELO3D INC [US]	Data assurance in three-dimensional forming
US2020125070	KRAUSER JACK T [US]	Methods, systems, apparatuses, and devices for fabricating 3D printed dental prostheses
WO2020080175	TORAY ENG CO LTD [JP]	Analysis device, analysis method, program, and storage medium
JP2020059278	GH KEIO GIJUKU	Information processing apparatus of system, has generation unit that is provided to generate model data for designing object and output control unit that is configured to output model data generated by generation unit
US2020118348	FUJI XEROX CO LTD [JP]	Three-dimensional object data generation apparatus, three-dimensional object forming apparatus, and non-transitory computer readable medium
WO2020076285	HEWLETT PACKARD DEVELOPMENT CO [US]	Validating object model data for additive manufacturing
WO2020072032	HEWLETT PACKARD DEVELOPMENT CO [US]	Determine ratios of build materials to achieve selected features
JP2020049715	FUJI XEROX CO LTD	Three-dimensional modeling system used for generating three-dimensional molded article E.G. Shape of vehicle, has main portion in which laser is irradiated at once with respect to cut locations from light-emitting point
US2020103847	HATANAKA SHINICHI [JP]; RICOH CO LTD [JP]	Three-dimensional data generating apparatus, recording medium, and three-dimensional data generating method

VOLVER A
CONTENIDO

