

PATENT ASSIGNMENT COVER SHEET

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SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
XEROX CORPORATION	08/11/2023
RECEIVING PARTY DATA	
Name:	ELEM ADDITIVE, LLC
Street Address:	3252 SOUTH MIAMI BLVD, SUITE 120
City:	DURHAM
State/Country:	NORTH CAROLINA
Postal Code:	27703
PROPERTY NUMBERS Total: 33	
Property Type	Number
Application Number:	16816853
Application Number:	16845312
Application Number:	16945509
Application Number:	18321509
Application Number:	17155455
Application Number:	18318974
Application Number:	17140954
Application Number:	17163355
Application Number:	17163363
Application Number:	17085557
Application Number:	17147773
Application Number:	17319830
Application Number:	17143378
Application Number:	17400916
Application Number:	17393115
Application Number:	17353555
Application Number:	17360515
Application Number:	17412399
Application Number:	17163368
Application Number:	16412801

Property Type	Number
Application Number:	17339969
Application Number:	17451501
Application Number:	17391265
Application Number:	17457346
Application Number:	17455785
Application Number:	17649393
Application Number:	17648490
Application Number:	17455590
Application Number:	17457966
Application Number:	17652911
Application Number:	17652914
Application Number:	17664470
Application Number:	17935691

CORRESPONDENCE DATA

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NAME OF SUBMITTER:	RUSSELL E. FOWLER II
SIGNATURE:	/Russell E. Fowler II/
DATE SIGNED:	12/01/2023

Total Attachments: 18

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Patent Assignment Agreement

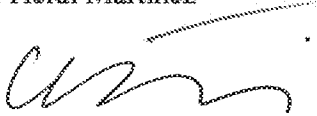

WHEREAS Xerox Corporation, a corporation incorporated under the laws of New York with offices at 201 Merritt 7, Norwalk CT 06851-1056 ("*Assignor*") agreed to assign or cause to be assigned to Elem Additive LLC, a corporation organized under the laws of Delaware with offices at 3252 South Miami Blvd, Suite 120, Durham, NC 27703 ("*Assignee*") all of Assignor's right, title and interest in and to the patent rights listed on Exhibit A1 hereto (the "*Assigned Patents*").

NOW, THEREFORE, for good and valuable consideration, receipt and sufficiency of which are hereby acknowledged, effective as of August 11, 2023 (the "*Effective Date*");

1. Assignor hereby grants, conveys and assigns to Assignee all its right, title and interest in and to (a) Assigned Patents and the inventions and improvements disclosed therein; (b) all reissues, divisionals, continuations, extensions, renewals, reexaminations and foreign counterparts thereof; and (c) all patents and applications which claim priority to or have common priority with any such patents or patent applications, or are linked with any such patents or patent applications by terminal disclaimer.
2. Assignor further grants, conveys and assigns to Assignee all its right, title and interest in and to any and all proceeds, causes of action and rights of recovery for past and future infringement or misappropriation of any of the Assigned Patents.
3. Assignor further grants, conveys and assigns to Assignee all its right, title and interest in and to any and all rights of Assignor to obtain reissues, re-examinations, continuations, continuations-in-part, divisions, extensions or other legal protections arising solely from the Assigned Patents that are or may be secured in any relevant jurisdiction anywhere in the world, including but not limited to the United States, its territories and possessions, as of the Effective Date or hereinafter in effect.
4. The Assigned Patents are conveyed subject to any and all licenses, permissions, consents or other rights that may have been granted by Assignor or its predecessors-in-interest with respect thereto prior to the Effective Date, or by Assignee to Assignor as of the Effective Date.
5. Assignor agrees that Assignee shall have the right to file or record this Patent Assignment with the United States Patent and Trademark Office or other such entities throughout the world, and Assignor authorizes and requests the relevant authorities to record Assignee as the assignee and owner of the Assigned Patents. Assignor shall execute and deliver to Assignee such documents and take such actions as requested by Assignee to register, evidence or perfect Assignee's rights under this Patent Assignment. In addition, Assignor hereby irrevocably designates and appoints Assignee and its duly authorized officers and agents as its agents

and attorneys in fact, to act for and on their behalf and stead to execute and file any such documents and to do all other lawfully permitted acts to register, evidence or perfect Assignee's rights under this Patent Assignment with the same legal force and effect as if executed by Assignor. This includes, but is not limited to, the power to insert on this Patent Assignment any further identification that may be necessary to comply with the rules of the United States Patent and Trademark Office, or rules of other entities throughout the world, for recordation of this document.

IN WITNESS WHEREOF, the undersigned Assignor has caused this Patent Assignment to be executed by its authorized representative and the undersigned Assignee has caused this Patent Assignment to be acknowledged by its authorized representative.

For XEROX CORPORATION By: Heidi Martinez  Signature Title: Chief IP Counsel, Associate General Counsel Date: 20-Sept.-23	For ELEM ADDITIVE, LLC By: Brian Matthews  Signature Title: CEO Date: 04-Sep-23
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Assigned PatentsAssigned Utility Patents

Patent Reference	Country	Status	Title	Application Number	Publication Number	Patent No.
20190068US02	United States of America	Granted	METAL POWDER MANUFACTURE USING A LIQUID METAL EJECTOR	16/412801	2019-0351488	11607727
20190138US02	United States of America	Granted	METHOD AND SYSTEM FOR OPERATING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER TO COMPENSATE FOR GEOMETRIC VARIATIONS THAT OCCUR DURING AN ADDITIVE MANUFACTURING PROCESS	16/845312	2020-0324486	11565475
20190139US02	United States of America	Published	NOZZLE CLEANING IN JETTING OF METAL ALLOYS	16/844524	2020-0324341	
20190378US01	United States of America	Granted	A THREE-DIMENSIONAL PRINTING SYSTEM AND METHOD OF THREE-DIMENSIONAL PRINTING	16/808266	2021-0276081	11358215
20190378CN01	China	Published	A THREE-DIMENSIONAL PRINTING SYSTEM AND METHOD OF THREE-DIMENSIONAL PRINTING	2021101388 53.1	CN113414403 A	
20190378JP01	Japan	Published	A THREE-DIMENSIONAL PRINTING SYSTEM AND METHOD OF THREE-DIMENSIONAL PRINTING	2021-013236	2021-138136	
20190378EP01	European Patent	Published	A THREE-DIMENSIONAL PRINTING SYSTEM AND METHOD OF THREE-DIMENSIONAL PRINTING	21157957.8	3875188	
20190378KR01	Korea, Republic of (KR)	Published	A THREE-DIMENSIONAL PRINTING SYSTEM AND METHOD OF THREE-DIMENSIONAL PRINTING	10-2021-0017941	10-2021-0111675	
20190403US01	United States of America	Granted	A THREE-DIMENSIONAL PRINTING SYSTEM AND METHOD OF THREE-DIMENSIONAL PRINTING	16/808285	2021-0276082	11260449
20190403CN01	China	Published	A THREE-DIMENSIONAL PRINTING SYSTEM AND METHOD OF THREE-DIMENSIONAL PRINTING	2021101367 01.2	113333776	
20190403JP01	Japan	Published	A THREE-DIMENSIONAL PRINTING SYSTEM AND METHOD OF THREE-DIMENSIONAL PRINTING	2021-013083	2021-138135	
20190403EP01	European Patent	Published	A THREE-DIMENSIONAL PRINTING SYSTEM AND METHOD OF THREE-DIMENSIONAL PRINTING	21157968.5	3875189	
20190403KR01	Korea, Republic of (KR)	Published	A THREE-DIMENSIONAL PRINTING SYSTEM AND METHOD OF THREE-DIMENSIONAL PRINTING	10-2021-0017942	10-2021-0111676	
20190413US02	United States of America	Granted	ATMOSPHERE AND PART FORMATION IN A LIQUID METAL DROP-ON-DEMAND PRINTER	16/991159	2021-0046541	11607724
20190413US03	United States of America	Published	ATMOSPHERE AND PART FORMATION IN A LIQUID METAL DROP-ON-DEMAND PRINTER	18/166104		
20190455US01	United States of America	Granted	VENTURI INLET PRINTHEAD	16/712725	2021-0178751	11220102
20190455CN01	China	Allowed	VENTURI INLET PRINTHEAD	2020112384 58.2	CN112976810 A	
20190455JP01	Japan	Published	VENTURI INLET PRINTHEAD	2020-192843	2021-094849	
20190455KR01	Korea, Republic of (KR)	Published	VENTURI INLET PRINTHEAD	10-2020-0157668	10-2021-0075003	
20190464US01	United States of America	Granted	GAS EXPANSION MATERIAL JETTING ACTUATOR	16/712618	2021-0178763	11440321

Patent Reference	Country	Status	Title	Application Number	Publication Number	Patent No.
20190464CN01	China	Published	GAS EXPANSION MATERIAL JETTING ACTUATOR	2020112371 85 X	CN112976809 A	
20190464JP01	Japan	Published	GAS EXPANSION MATERIAL JETTING ACTUATOR	2020-192811	2021-095634	
20190464EP01	European Patent	Published	GAS EXPANSION MATERIAL JETTING ACTUATOR	20210488.1	3835068	
20190464KR01	Korea, Republic of (KR)	Published	GAS EXPANSION MATERIAL JETTING ACTUATOR	10-2020-0157669	10-2021-0075004	
20190503US01	United States of America	Allowed	SURFACE TREATED ADDITIVE MANUFACTURING PRINthead NOZZLES AND METHODS FOR THE SAME	17/017392	2021-0069972	
20190503US02	United States of America	Published	SURFACE TREATED ADDITIVE MANUFACTURING PRINthead NOZZLES AND METHODS FOR THE SAME	17/017447	2021-0069778	
20190579US01	United States of America	Granted	METHOD AND SYSTEM FOR OPERATING A MODULAR HEATER TO IMPROVE LAYER BONDING IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	16/816853	2021-0283853	11485089
20190579CN01	China	Allowed	METHOD AND SYSTEM FOR OPERATING A MODULAR HEATER TO IMPROVE LAYER BONDING IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	2021101732 47.3	CN113458414 A	
20190579JP01	Japan	Published	METHOD AND SYSTEM FOR OPERATING A MODULAR HEATER TO IMPROVE LAYER BONDING IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	2021-025207	2021-143420	
20190579EP01	European Patent	Published	METHOD AND SYSTEM FOR OPERATING A MODULAR HEATER TO IMPROVE LAYER BONDING IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	21159105.2	3878581	
20190579KR01	Korea, Republic of (KR)	Published	METHOD AND SYSTEM FOR OPERATING A MODULAR HEATER TO IMPROVE LAYER BONDING IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	10-2021-0022258	10-2021-0116231	
20190840US01	United States of America	Granted	SYSTEM AND METHOD FOR DETERMINING A TEMPERATURE OF AN OBJECT	16/903813	2021-0394448	11478991
20190840US02	United States of America	Granted	AN OBJECT PRINTED BY A 3D PRINTER AND A METHOD FOR DETERMINING THE TEMPERATURE OF THE OBJECT	16/903835	2021-0396593	11387099
20190840US03	United States of America	Granted	A SYSTEM AND METHOD FOR DETERMINING A TEMPERATURE DIFFERENTIAL BETWEEN PORTIONS OF AN OBJECT PRINTED BY A 3D PRINTER	16/903855	2021-0396591	11499873
20190840US04	United States of America	Published	AN OBJECT PRINTED BY A 3D PRINTER AND A METHOD FOR DETERMINING THE TEMPERATURE OF THE OBJECT	17/655246	2022-0205845	
20190840CN01	China	Published	SYSTEM AND METHOD FOR DETERMINING A TEMPERATURE OF AN OBJECT	2021105268 191	CN113997395 A	
20190840JP01	Japan	Granted	SYSTEM AND METHOD FOR DETERMINING A TEMPERATURE OF AN OBJECT	2021-092998	2021-195620	7238017
20190840EP01	European Patent	Published	SYSTEM AND METHOD FOR DETERMINING A TEMPERATURE OF AN OBJECT	21177430.2	3926314	

Patent Reference	Country	Status	Title	Application Number	Publication Number	Patent No.
20190840KR01	Korea, Republic of (KR)	Granted	SYSTEM AND METHOD FOR DETERMINING A TEMPERATURE OF AN OBJECT	10-2021-0075857	10-2021-0156224	10-2478412
20200125US01	United States of America	Granted	METHOD AND SYSTEM FOR OPERATING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER TO FORM ELECTRICAL CIRCUITS ON SUBSTRATES	16/945509	2022-0032550	
20200125US02	United States of America	Application	METHOD FOR OPERATING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER TO FORM ELECTRICAL CIRCUITS ON SUBSTRATES	18/321509		
20200125CN01	China	Published	METHOD AND SYSTEM FOR OPERATING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER TO FORM ELECTRICAL CIRCUITS ON SUBSTRATES	2021107321 56.9	CN114054779 A	
20200125JP01	Japan	Published	METHOD AND SYSTEM FOR OPERATING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER TO FORM ELECTRICAL CIRCUITS ON SUBSTRATES	2021-120199	2022-027546	
20200125EP01	European Patent	Published	METHOD AND SYSTEM FOR OPERATING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER TO FORM ELECTRICAL CIRCUITS ON SUBSTRATES	21182997.3	3944912	
20200125KR01	Korea, Republic of (KR)	Published	METHOD AND SYSTEM FOR OPERATING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER TO FORM ELECTRICAL CIRCUITS ON SUBSTRATES	10-2021-0097489	10-2022-0015955	
20200232US01	United States of America	Allowed	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	17/060600	2022-0105684	
20200232US02	United States of America	Published	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	17/060825	2022-0105673	
20200232US03	United States of America	Granted	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	17/061213	2022-0105561	11504766
20200232CN01	China	Published	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	2021110735 75.2	CN114273758 A	
20200232CN02	China	Published	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	2021110782 768	CN114273669 A	
20200232CN03	China	Published	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	2021111290 794	CN114273670 A	
20200232JP01	Japan	Published	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	2021-159865	2022-059583	
20200232JP02	Japan	Published	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	2021-153707	2022-059578	
20200232JP03	Japan	Published	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	2021-159903	2022-059584	
20200232DE01	Germany (Federal Republic of)	Published	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	1020211249 90.2	102021124990 2	
20200232DE02	Germany (Federal Republic of)	Published	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	1020211249 91.0	102021124991 0	
20200232DE03	Germany (Federal Republic of)	Published	MICRO-WELDING USING A THREE DIMENSIONAL PRINTER	1020211233 01.1	102021123301 1	

Patent Reference	Country	Status	Title	Application Number	Publication Number	Patent No.
20200349US01	United States of America	Published	METHOD AND SYSTEM FOR OPERATING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER TO SHORTEN OBJECT FORMATION TIME	17/154063	2022-0226888	
20200410US01	United States of America	Granted	REMOVABLE INNER SHELL FOR DROSS CONTROL AND/OR REMOVAL FOR METAL PRINTER	17/131372	2022-0193780	11618086
20200410CN01	China	Published	REMOVABLE INNER SHELL FOR DROSS CONTROL AND/OR REMOVAL FOR METAL PRINTER	2021113726 83X	CN114653969 A	
20200410JP01	Japan	Published	REMOVABLE INNER SHELL FOR DROSS CONTROL AND/OR REMOVAL FOR METAL PRINTER	2021-202829	2022-099280	
20200410DE01	Germany (Federal Republic of)	Published	REMOVABLE INNER SHELL FOR DROSS CONTROL AND/OR REMOVAL FOR METAL PRINTER	1020211341 62.0	102021134162.0	
20200410KR01	Korea, Republic of (KR)	Published	REMOVABLE INNER SHELL FOR DROSS CONTROL AND/OR REMOVAL FOR METAL PRINTER	10-2021-0166828	10-2022-0090412	
20200411US01	United States of America	Granted	METHOD FOR MAGNETOHYDRODYNAMIC (MHD) PRINTHEAD/NOZZLE REUSE	17/131402	2022-0194082	11400714
20200411US02	United States of America	Published	METHOD FOR MAGNETOHYDRODYNAMIC (MHD) PRINTHEAD/NOZZLE REUSE	17/850526	2022-0332116	
20200411US03	United States of America	Published	SYSTEM AND METHOD FOR MAGNETOHYDRODYNAMIC (MHD) PRINTHEAD/NOZZLE	17/851551	2022-0324031	
20200411CN01	China	Published	METHOD FOR MAGNETOHYDRODYNAMIC (MHD) PRINTHEAD/NOZZLE REUSE	2021113762 037	CN114653964 A	
20200411JP01	Japan	Published	METHOD FOR MAGNETOHYDRODYNAMIC (MHD) PRINTHEAD/NOZZLE REUSE	2021-202851	2022-099281	
20200411DE01	Germany (Federal Republic of)	Published	METHOD FOR MAGNETOHYDRODYNAMIC (MHD) PRINTHEAD/NOZZLE REUSE	1020211339 45.6	102021133945.6	
20200411KR01	Korea, Republic of (KR)	Published	METHOD FOR MAGNETOHYDRODYNAMIC (MHD) PRINTHEAD/NOZZLE REUSE	10-2021-0166829	10-2022-0090413	
20200412US01	United States of America	Published	RESISTIVE LIQUID METAL LEVEL SENSING IN A MAGNETOHYDRODYNAMIC (MHD) JETTING SYSTEM	17/131498	2022-0194088	
20200420US01	United States of America	Published	FABRICATION OF LATTICE STRUCTURES WITH THREE DIMENSIONAL PRINTER	17/143007	2022-0212249	
20200420US02	United States of America	Published	FABRICATION OF LATTICE STRUCTURES WITH A THREE-DIMENSIONAL PRINTER	18/301100	2023-0249247	
20200420JP01	Japan	Published	FABRICATION OF LATTICE STRUCTURES WITH THREE DIMENSIONAL PRINTER	2021-206519	2022-106284	
20200420DE01	Germany (Federal Republic of)	Published	FABRICATION OF LATTICE STRUCTURES WITH THREE DIMENSIONAL PRINTER	1020221001 53.9	102022100153.9	
20200422US01	United States of America	Published	BUILDING AN OBJECT WITH A THREE-DIMENSIONAL PRINTER USING VIBRATIONAL ENERGY	17/144910	2022-0219381	
20200422JP01	Japan	Published	BUILDING AN OBJECT WITH A THREE-DIMENSIONAL PRINTER USING VIBRATIONAL ENERGY	2021-207640	2022-107516	

Patent Reference	Country	Status	Title	Application Number	Publication Number	Patent No.
20200422DE01	Germany (Federal Republic of)	Published	BUILDING AN OBJECT WITH A THREE-DIMENSIONAL PRINTER USING VIBRATIONAL ENERGY	102022100154.7	102022100154.7	
20200423US01	United States of America	Published	BUILDING AN OBJECT WITH A THREE-DIMENSIONAL PRINTER USING BURST MODE JETTING	17/121197	2022-0184708	
20200423CN01	China	Published	BUILDING AN OBJECT WITH A THREE-DIMENSIONAL PRINTER USING BURST MODE JETTING	202111446933X	CN114619046A	
20200423JP01	Japan	Published	BUILDING AN OBJECT WITH A THREE-DIMENSIONAL PRINTER USING BURST MODE JETTING	2021-201354	2022-094339	
20200423DE01	Germany (Federal Republic of)	Published	BUILDING AN OBJECT WITH A THREE-DIMENSIONAL PRINTER USING BURST MODE JETTING	102021129030.9	102021129030.9	
20200423KR01	Korea, Republic of (KR)	Published	BUILDING AN OBJECT WITH A THREE-DIMENSIONAL PRINTER USING BURST MODE JETTING	10-2021-0175691	10-2022-0085015	
20200427US01	United States of America	Granted	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	17/155455	2022-0240387	11737216
20200427US02	United States of America	Application	METHOD FOR OPERATING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER TO FORM VIAS IN PRINTED CIRCUIT BOARDS WITH CONDUCTIVE METAL	18/318974		
20200430US01	United States of America	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER HAVING AN INCREASED MATERIAL DEPOSITION RATE	17/140954	2022-0212265	
20200430CN01	China	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER HAVING AN INCREASED MATERIAL DEPOSITION RATE	202210001307.8	CN114713856A	
20200430JP01	Japan	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER HAVING AN INCREASED MATERIAL DEPOSITION RATE	2021-206176	2022-105475	
20200430EP01	European Patent	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER HAVING AN INCREASED MATERIAL DEPOSITION RATE	22150083.8	4023369	
20200430KR01	Korea, Republic of (KR)	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER HAVING AN INCREASED MATERIAL DEPOSITION RATE	10-2022-0000840	10-2022-0098695	
20200438US01	United States of America	Allowed	SYSTEM AND METHOD FOR CALIBRATING LAG TIME IN A THREE-DIMENSIONAL OBJECT PRINTER	17/163355	2022-0242048	
20200439US01	United States of America	Granted	SYSTEM AND METHOD FOR REDUCING DROP PLACEMENT ERRORS AT PERIMETER FEATURES ON AN OBJECT IN A THREE-DIMENSIONAL (3D) OBJECT PRINTER	17/163363	2022-0241865	11701712
20200439US02	United States of America	Granted	SYSTEM AND METHOD FOR REDUCING DROP PLACEMENT ERRORS AT PERIMETER FEATURES ON AN OBJECT IN A THREE-DIMENSIONAL (3D) OBJECT PRINTER	17/163368	2022-0241866	11673198
20200450US01	United States of America	Granted	THREE-DIMENSIONAL PRINTER WITH NITROGEN ATMOSPHERE	17/109800	2022-0168817	11666975
20200469US01	United States of America	Granted	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER WITH A THERMALLY INSULATED BUILD PLATFORM TRANSLATIONAL MECHANISM	17/085557	2022-0134418	11684972

Patent Reference	Country	Status	Title	Application Number	Publication Number	Patent No.
20200506US01	United States of America	Allowed	MELTED METAL LEVEL SENSOR FOR A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	17/319830	2022-0362858	
20200506CN01	China	Published	MELTED METAL LEVEL SENSOR FOR A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	2022103710191	CN115338431A	
20200506JP01	Japan	Published	MELTED METAL LEVEL SENSOR FOR A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	2022-065121	2022-176099	
20200506DE01	Germany (Federal Republic of)	Published	MELTED METAL LEVEL SENSOR FOR A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	1020221118509	1020221118509	
20200585US01	United States of America	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER WITH A THERMALLY INSULATED BUILD PLATFORM TRANSLATIONAL MECHANISM	17/143378	2022-0212257	
20200601US01	United States of America	Published	CLAMPING MECHANISM FOR 3D PRINTING BUILD PLATE	17/400916	2023-0049328	
20200640US01	United States of America	Allowed	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD FOR PREPARING THE METAL DROP EJECTING 3D OBJECT PRINTER FOR PRINTING	17/147773	2022-0219238	
20200640US02	United States of America	Published	A REMOVABLE VESSEL AND METAL INSERT FOR PREPARING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER FOR PRINTING	17/147810	2022-0219240	
20200640CN01	China	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD FOR PREPARING THE METAL DROP EJECTING 3D OBJECT PRINTER FOR PRINTING	202210014413.X	CN114309663A	
20200640CN02	China	Published	A REMOVABLE VESSEL AND METAL INSERT FOR PREPARING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER FOR PRINTING	202210034041.7	CN114762899A	
20200640JP01	Japan	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD FOR PREPARING THE METAL DROP EJECTING 3D OBJECT PRINTER FOR PRINTING	2021-214100	2022-108720	
20200640JP02	Japan	Published	A REMOVABLE VESSEL AND METAL INSERT FOR PREPARING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER FOR PRINTING	2021-214153	2022-108721	
20200640EP01	European Patent	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD FOR PREPARING THE METAL DROP EJECTING 3D OBJECT PRINTER FOR PRINTING	22150215.6	4029631	
20200640EP02	European Patent	Published	A REMOVABLE VESSEL AND METAL INSERT FOR PREPARING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER FOR PRINTING	22150218.0	4029632	
20200640KR01	Korea, Republic of (KR)	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD FOR PREPARING THE METAL DROP EJECTING 3D OBJECT PRINTER FOR PRINTING	10-2022-0001952	10-2022-0102571	

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20200640KR02	Korea, Republic of (KR)	Published	A REMOVABLE VESSEL AND METAL INSERT FOR PREPARING A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER FOR PRINTING	10-2022-0001953	10-2022-0102572	
20200663US02	United States of America	Published	METHOD FOR HIGH TEMPERATURE HEAT TREATING OF METAL OBJECTS FORMED IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	17/451501	2022-0126371	
20200693US01	United States of America	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	17/457966	2023-0173585	
20200693CN01	China	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	2022113726 016		
20200693JP01	Japan	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	2022-176834		
20200693EP01	European Patent	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	22208366 9		
20200693KR01	Korea, Republic of (KR)	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	10-2022-0165588		
20200720US01	United States of America	Allowed	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	17/393115	2023-0037539	
20200720CN01	China	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	2022108498 60.7	CN115703154 A	
20200720JP01	Japan	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	2022-112509	2023-022818	
20200720DE01	Germany (Federal Republic of)	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	1020221187 48.9		
20200723US01	United States of America	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	17/353555	2022-04402060	
20200723CN01	China	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	2022105613 25.1	CN115570152 A	

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20200723JP01	Japan	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	2022-083261	2023-001876	
20200723DE01	Germany (Federal Republic of)	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	102022114596.4	102022114596.4	
20200723KR01	Korea, Republic of (KR)	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	10-2022-0073300	10-2022-0169910	
20200731US01	United States of America	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FACILITATING RELEASE OF A METAL OBJECT FROM A BUILD PLATFORM	17/360515	2022-0410302	
20200731CN01	China	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FACILITATING RELEASE OF A METAL OBJECT FROM A BUILD PLATFORM	2022105982947	CN115592138A	
20200731JP01	Japan	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FACILITATING RELEASE OF A METAL OBJECT FROM A BUILD PLATFORM	2022-085029	2023-007414	
20200731DE01	Germany (Federal Republic of)	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FACILITATING RELEASE OF A METAL OBJECT FROM A BUILD PLATFORM	102022114871.8	102022114871.8	
20200731KR01	Korea, Republic of (KR)	Application	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FACILITATING RELEASE OF A METAL OBJECT FROM A BUILD PLATFORM	10-2022-0076025		
20200733US01	United States of America	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	17/412399	2023-0063103	
20200733CN01	China	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	202210884730.7	CN115722686A	
20200733JP01	Japan	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	2022-118699	2023-033137	
20200733DE01	Germany (Federal Republic of)	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FORMING METAL SUPPORT STRUCTURES	102022119270.9		
20210001US01	United States of America	Granted	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER WITH DOUBLE THERMAL LAYER INSULATION FOR THE BUILD PLATFORM TRANSLATIONAL MECHANISM	17/339969	2022-0388063	11731199

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20210036US01	United States of America	Granted	LIQUID METAL EJECTOR LEVEL SENSING SYSTEM AND METHODS THEREOF	17/367991	2023-0008592	11654482
20210036US02	United States of America	Published	LIQUID METAL EJECTOR LEVEL SENSING SYSTEM AND METHODS THEREOF	18/298847	2023-0241670	
20210125US01	United States of America	Published	VESSEL FOR MELTING METAL IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	17/391265	2023-0034213	
20210125CN01	China	Published	VESSEL FOR MELTING METAL IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	2022108498 59.4	CN115701367 A	
20210125JP01	Japan	Published	VESSEL FOR MELTING METAL IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	2022-112445	2023-021931	
20210125DE01	Germany (Federal Republic of)	Published	VESSEL FOR MELTING METAL IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	1020221176 91.6		
20210125KR01	Korea, Republic of (KR)	Application	VESSEL FOR MELTING METAL IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	10-2022-0093679		
20210127US01	United States of America	Published	DROSS ABATEMENT SYSTEM AND METHODS THEREOF	17/348908	2022-0402023	
20210127CN01	China	Published	DROSS ABATEMENT SYSTEM AND METHODS THEREOF	2022105223 28.4	CN115475966 A	
20210127JP01	Japan	Published	DROSS ABATEMENT SYSTEM AND METHODS THEREOF	2022-083230	2022-192013	
20210127DE01	Germany (Federal Republic of)	Published	DROSS ABATEMENT SYSTEM AND METHODS THEREOF	1020221143 15.5	102022114315 5	
20210137US01	United States of America	Published	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	17/371391	2023-0012088	
20210137US02	United States of America	Published	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	17/371470	2023-0011639	
20210137CN01	China	Published	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	2022106761 97.5	CN115647384 A	
20210137CN02	China	Published	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	2022106605 93.9	CN115592134 A	
20210137JP01	Japan	Published	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	2022-097900	2023-010605	
20210137JP02	Japan	Published	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	2022-097917	2023-010606	
20210137DE01	Germany (Federal Republic of)	Published	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	1020221151 46.8		
20210137DE02	Germany (Federal Republic of)	Published	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	1020221154 73.4		
20210137KR01	Korea, Republic of (KR)	Application	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	10-2022-0081307		
20210137KR02	Korea, Republic of (KR)	Application	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	10-2022-0081281		

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20210168US01	United States of America	Published	MODIFICATION OF THE METAL JETTING COMPOSITIONS AND METHODS THEREOF	17/462804	2023-0066534	
20210168US02	United States of America	Published	EJECTOR FOR MODIFICATION OF METAL JETTING COMPOSITIONS AND METHODS THEREOF	17/462713	2023-0063825	
20210168CN01	China	Published	MODIFICATION OF THE METAL JETTING COMPOSITIONS AND METHODS THEREOF	2022109196 22.9	CN115722679 A	
20210168CN02	China	Published	EJECTOR FOR MODIFICATION OF METAL JETTING COMPOSITIONS AND METHODS THEREOF	2022108899 96.0	CN115722646 A	
20210168JP01	Japan	Published	MODIFICATION OF THE METAL JETTING COMPOSITIONS AND METHODS THEREOF	2022-124730	2023-035880	
20210168JP02	Japan	Published	EJECTOR FOR MODIFICATION OF METAL JETTING COMPOSITIONS AND METHODS THEREOF	2022-126107	2023-035885	
20210168DE01	Germany (Federal Republic of)	Published	MODIFICATION OF THE METAL JETTING COMPOSITIONS AND METHODS THEREOF	1020221202 24.0		
20210168DE02	Germany (Federal Republic of)	Published	EJECTOR FOR MODIFICATION OF METAL JETTING COMPOSITIONS AND METHODS THEREOF	1020221202 23.2		
20210168KR01	Korea, Republic of (KR)	Application	MODIFICATION OF THE METAL JETTING COMPOSITIONS AND METHODS THEREOF	10-2022-0106921		
20210168KR02	Korea, Republic of (KR)	Application	EJECTOR FOR MODIFICATION OF METAL JETTING COMPOSITIONS AND METHODS THEREOF	10-2022-0106922		
20210193US01	United States of America	Published	DROSS EXTRACTION SYSTEM AND METHODS THEREOF	17/374762	2023-0015142	
20210381US01	United States of America	Published	ALLOYING OF METAL JETTING COMPOSITIONS AND METHODS THEREOF	17/448940	2023-0097037	
20210382CN01	China	Published	ALLOYING OF METAL JETTING COMPOSITIONS AND METHODS THEREOF	2022110719 87.7		
20210382JP01	Japan	Published	ALLOYING OF METAL JETTING COMPOSITIONS AND METHODS THEREOF	2022-145568		
20210382EP01	European Patent	Published	ALLOYING OF METAL JETTING COMPOSITIONS AND METHODS THEREOF	22194327.7	4155010	
20210390US01	United States of America	Published	LIQUID METAL DROP MASS MEASUREMENTS AND METHODS THEREOF	17/447174	2023-0076563	
20210390JP01	Japan	Published	LIQUID METAL DROP MASS MEASUREMENTS AND METHODS THEREOF	2022-135464	2023-039415	
20210390DE01	Germany (Federal Republic of)	Published	LIQUID METAL DROP MASS MEASUREMENTS AND METHODS THEREOF	1020221202 25.9		
20210391US01	United States of America	Allowed	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FACILITATING BUILD AND RELEASE OF A METAL OBJECT FROM A BUILD PLATFORM	17/457346	2023-0076563	
20210391CN01	China	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FACILITATING BUILD AND RELEASE OF A METAL OBJECT FROM A BUILD PLATFORM	2022113592 647		

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20210391JP01	Japan	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FACILITATING BUILD AND RELEASE OF A METAL OBJECT FROM A BUILD PLATFORM	2022-176832		
20210391DE01	Germany (Federal Republic of)	Published	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FACILITATING BUILD AND RELEASE OF A METAL OBJECT FROM A BUILD PLATFORM	1020221316 39.4		
20210411US01	United States of America	Published	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER HAVING AN IMPROVED HEATED BUILD PLATFORM	17/455785	2023-0158573	
20210421US01	United States of America	Published	DEVICE AND METHOD OF OPERATION FOR A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER THAT FACILITATES REMOVAL OF SUPPORT STRUCTURES FROM A METAL OBJECT	17/649393	2023-0241680	
20210421CN01	China	Application	DEVICE AND METHOD OF OPERATION FOR A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER THAT FACILITATES REMOVAL OF SUPPORT STRUCTURES FROM A METAL OBJECT	2023100307 945		
20210421JP01	Japan	Application	DEVICE AND METHOD OF OPERATION FOR A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER THAT FACILITATES REMOVAL OF SUPPORT STRUCTURES FROM A METAL OBJECT	2023-000506		
20210421DE01	Germany (Federal Republic of)	Application	DEVICE AND METHOD OF OPERATION FOR A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER THAT FACILITATES REMOVAL OF SUPPORT STRUCTURES FROM A METAL OBJECT	1020231001 95.7		
20210421KR01	Korea, Republic of (KR)	Application	DEVICE AND METHOD OF OPERATION FOR A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER THAT FACILITATES REMOVAL OF SUPPORT STRUCTURES FROM A METAL OBJECT	10-2023-0009930		
20210430US01	United States of America	Published	DEVICE AND METHOD FOR CLEANING AN ORIFICE IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) METAL OBJECT PRINTER	17/648490	2023-0226614	
20210458US01	United States of America	Published	EJECTOR FOR METAL JETTING BULK METALLIC GLASS COMPOSITIONS AND METHODS THEREOF	17/554089	2023-0191487	
20210502US01	United States of America	Published	METAL DROP EJECTING THREE-DIMENSIONAL(3D) OBJECT PRINTER AND IMPROVED METHOD FOR OPERATING THE PRINTER	17/455590	2023-0158026	
20210502CN01	China	Published	METAL DROP EJECTING THREE-DIMENSIONAL(3D) OBJECT PRINTER AND IMPROVED METHOD FOR OPERATING THE PRINTER	2022114239 328		

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20210502JP01	Japan	Published	METAL DROP EJECTING THREE-DIMENSIONAL(3D) OBJECT PRINTER AND IMPROVED METHOD FOR OPERATING THE PRINTER	2022-175525		
20210502DE01	Germany (Federal Republic of)	Published	METAL DROP EJECTING THREE-DIMENSIONAL(3D) OBJECT PRINTER AND IMPROVED METHOD FOR OPERATING THE PRINTER	1020221306 24.0		
20210502KR01	Korea, Republic of (KR)	Application	METAL DROP EJECTING THREE-DIMENSIONAL(3D) OBJECT PRINTER AND IMPROVED METHOD FOR OPERATING THE PRINTER	10-2022-0151617		
20210512US01	United States of America	Published	LIQUID METAL EJECTOR DUAL SENSOR SYSTEM AND METHODS THEREOF	17/454926	2023-0150033	
20210512CN01	China	Published	LIQUID METAL EJECTOR DUAL SENSOR SYSTEM AND METHODS THEREOF	2022114374 65.4		
20210512JP01	Japan	Published	LIQUID METAL EJECTOR DUAL SENSOR SYSTEM AND METHODS THEREOF	2022-179183		
20210512EP01	European Patent	Published	LIQUID METAL EJECTOR DUAL SENSOR SYSTEM AND METHODS THEREOF	22203929 9		
20210512KR01	Korea, Republic of (KR)	Application	LIQUID METAL EJECTOR DUAL SENSOR SYSTEM AND METHODS THEREOF	10-2022-0149380		
20210514US01	United States of America	Application	LIQUID METAL EJECTOR LEVEL SENSE SYSTEM AND METHODS THEREOF	17/853676		
20210514CN01	China	Application	LIQUID METAL EJECTOR LEVEL SENSE SYSTEM AND METHODS THEREOF	2023106276 07.1		
20210514JP01	Japan	Application	LIQUID METAL EJECTOR LEVEL SENSE SYSTEM AND METHODS THEREOF	1020231150 41.3		
20210514DE01	Germany (Federal Republic of)	Application	LIQUID METAL EJECTOR LEVEL SENSE SYSTEM AND METHODS THEREOF	2023-090719		
20210514KR01	Korea, Republic of (KR)	Application	LIQUID METAL EJECTOR LEVEL SENSE SYSTEM AND METHODS THEREOF	10-2023-0080174		
20210517US01	United States of America	Published	LIQUID METAL EJECTOR BUOYANT SENSING SYSTEM AND METHODS THEREOF	17/534040	2023-0158575	
20210540US01	United States of America	Application	METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR BUILDING SUPPORT STRUCTURES	17/652911		
20210540CN01	China	Application	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR BUILDING SUPPORT STRUCTURES	2023101591 135		
20210540JP01	Japan	Application	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR BUILDING SUPPORT STRUCTURES	2023-023408		
20210540DE01	Germany (Federal Republic of)	Application	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR BUILDING SUPPORT STRUCTURES	1020231017 32.2		
20210540KR01	Korea, Republic of (KR)	Application	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR BUILDING SUPPORT STRUCTURES	10-2023-0023504		

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20210571US01	United States of America	Application	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR BUILDING SUPPORT STRUCTURES	17/652914		
20210588US01	United States of America	Application	A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER AND METHOD OF OPERATION FOR FACILITATING BUILD AND RELEASE OF A METAL OBJECT FROM A BUILD PLATFORM	17/652919		
20210591US01	United States of America	Application	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	17/653138		
20210591JP01	Japan	Application	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	2023-024915		
20210591DE01	Germany (Federal Republic of)	Application	SYSTEM AND METHOD FOR CONTROLLING TEMPERATURE IN A THREE-DIMENSIONAL (3D) PRINTER	1020231039 10.5		
20210604US01	United States of America	Application	DROSS EXTRACTION SYSTEM FOR AN MHD PRINTER AND METHODS THEREOF	17/651248		
20210604JP01	Japan	Application	DROSS EXTRACTION SYSTEM FOR AN MHD PRINTER AND METHODS THEREOF	2023-016670		
20210604DE01	Germany (Federal Republic of)	Application	DROSS EXTRACTION SYSTEM FOR AN MHD PRINTER AND METHODS THEREOF	1020231017 31.4		
20210654US01	United States of America	Application	DROSS EXTRACTION IMPLEMENT FOR AN MHD PRINTER AND METHODS THEREOF	17/652532		
20210654JP01	Japan	Application	DROSS EXTRACTION IMPLEMENT FOR AN MHD PRINTER AND METHODS THEREOF	2023-023202		
20210654DE01	Germany (Federal Republic of)	Application	DROSS EXTRACTION IMPLEMENT FOR AN MHD PRINTER AND METHODS THEREOF	1020231039 14.8		
20210679US01	United States of America	Application	THREE-DIMENSIONAL UNSUPPORTED STRUCTURAL FEATURES AND SYSTEM AND METHODS THEREOF	17/843098		
20210679CN01	China	Application	THREE-DIMENSIONAL UNSUPPORTED STRUCTURAL FEATURES AND SYSTEM AND METHODS THEREOF	2023106300 47.5		
20210679JP01	Japan	Application	THREE-DIMENSIONAL UNSUPPORTED STRUCTURAL FEATURES AND SYSTEM AND METHODS THEREOF	23176187.5		
20210679EP01	European Patent	Application	THREE-DIMENSIONAL UNSUPPORTED STRUCTURAL FEATURES AND SYSTEM AND METHODS THEREOF	2023-085820		
20210679KR01	Korea, Republic of (KR)	Application	THREE-DIMENSIONAL UNSUPPORTED STRUCTURAL FEATURES AND SYSTEM AND METHODS THEREOF	10-2023-0074664		
20220022US01	United States of America	Application	METHOD AND APPARATUS FOR FORMING OVERHANGING STRUCTURES IN ADDITIVE MANUFACTURED PARTS THAT HAVE AN IMPROVED SURFACE ROUGHNESS	17/664470		
20220022CN01	China	Application	METHOD AND APPARATUS FOR FORMING OVERHANGING STRUCTURES IN ADDITIVE MANUFACTURED PARTS THAT HAVE AN IMPROVED SURFACE ROUGHNESS	2023105137 071		

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20220022JP01	Japan	Application	METHOD AND APPARATUS FOR FORMING OVERHANGING STRUCTURES IN ADDITIVE MANUFACTURED PARTS THAT HAVE AN IMPROVED SURFACE ROUGHNESS	23171449.4		
20220022EP01	European Patent	Application	METHOD AND APPARATUS FOR FORMING OVERHANGING STRUCTURES IN ADDITIVE MANUFACTURED PARTS THAT HAVE AN IMPROVED SURFACE ROUGHNESS	2023-077801		
20220022KR01	Korea, Republic of (KR)	Application	METHOD AND APPARATUS FOR FORMING OVERHANGING STRUCTURES IN ADDITIVE MANUFACTURED PARTS THAT HAVE AN IMPROVED SURFACE ROUGHNESS	10-2023-0060889		
20220047US01	United States of America	Application	DYNAMIC IN-FLIGHT CHARACTERIZATION OF BUILD MATERIAL IN A 3D PRINTER AND SYSTEM AND METHODS THEREOF	18/059638		
20220053US01	United States of America	Application	PRINTING A THREE-DIMENSIONAL PART WITH ENHANCED DROP PLACEMENT AND SYSTEM AND METHODS THEREOF	18/047359		
20220054US01	United States of America	Application	PRINTING A THREE-DIMENSIONAL PART TO ENHANCE SEPARATION AND SYSTEM AND METHODS THEREOF	18/047365		
20220058US01	United States of America	Application	PRINTING A THREE-DIMENSIONAL PART TO ENHANCE SEPARATION AND SYSTEM AND METHODS THEREOF	18/047371		
20220063US01	United States of America	Application	HIGH-THROUGHPUT LIQUID METAL INKJET NOZZLE WITH	17/820468		
20220063US02	United States of America	Application	POROUS LAYER FOR MENISCUS DAMPING HIGH-THROUGHPUT LIQUID METAL INKJET NOZZLE WITH	17/820481		
20220063CN01	China	Application	POROUS LAYER FOR MENISCUS DAMPING HIGH-THROUGHPUT LIQUID METAL INKJET NOZZLE WITH POROUS LAYER FOR MENISCUS DAMPING	2023109167 76.7		
20220063JP01	Japan	Currently Designated To Be Filed	HIGH-THROUGHPUT LIQUID METAL INKJET NOZZLE WITH POROUS LAYER FOR MENISCUS DAMPING	2023-129202		
20220063EP01	European Patent	Application	HIGH-THROUGHPUT LIQUID METAL INKJET NOZZLE WITH POROUS LAYER FOR MENISCUS DAMPING	23188900.7		
20220063KR01	Korea, Republic of (KR)	Currently Designated To Be Filed	HIGH-THROUGHPUT LIQUID METAL INKJET NOZZLE WITH POROUS LAYER FOR MENISCUS DAMPING	10-2023-0104484		
20220070US01	United States of America	Application	LEVERAGING PRINTING STANDOFF DISTANCE IN THREE-DIMENSIONAL PRINTING TO ENHANCE PART SEPARATION AND SYSTEM AND METHODS THEREOF	17/883088		
20220070JP01	Japan	Currently Designated To Be Filed	LEVERAGING PRINTING STANDOFF DISTANCE IN THREE-DIMENSIONAL PRINTING TO ENHANCE PART SEPARATION AND SYSTEM AND METHODS THEREOF	2023-126386		
20220103US01	United States of America	Application	SYSTEM AND METHOD FOR CONTROLLING FLOW THROUGH A 3D PRINTER	17/930226		

Patent Reference	Country	Status	Title	Application Number	Publication Number	Patent No.
20220103US02	United States of America	Application	SYSTEM AND METHOD FOR CONTROLLING FLOW THROUGH A 3D PRINTER	17/930233		
20220107US01	United States of America	Application	INSPECTION SYSTEM FOR THREE-DIMENSIONAL PRINTER AND METHODS THEREOF	18/059643		
20220111US01	United States of America	Application	IMPROVED VESSEL FOR ATTENUATING DROSS IN MELTED METAL IN A METAL DROP EJECTING THREE-DIMENSIONAL (3D) OBJECT PRINTER	17/935691		
20220182US01	United States of America	Application	METHOD OF CREATING BIMETALLIC PARTS USING LIQUID METAL ADDITIVE MANUFACTURING.	18/213577		
20220184US01	United States of America	Application	LINE SPACING MODIFICATION TO PRINT UNSUPPORTED STEP OUT IN 3D METAL OBJECTS	18/338998		
20220192US01	United States of America	Application	A NON-CONTACT METHOD FOR CLEARING OCCLUSION FROM A METAL JETTING PRINthead NOZZLE	18/307352		
20220195US01	United States of America	Application	BRIDGING INTERNAL CHANNELS BEYOND 1.75MM IN 3D METAL OBJECTS	18/233134		
20220410US01	United States of America	Application	PERIMETER AND INFILL OPTIMIZATIONS FOR LIQUID METAL JETTING 3D PRINTING	18/329259		
20220505US01	United States of America	Application	SPARSE FILL IN 3D METAL OBJECTS	18/358369		

Assigned Design Patents

Patent Reference	Country	Status	Patent Application Title	Application Number	Publication Number	Patent No.
20190681US01	United States of America	Granted	3D PRINTER	29/713686		D9211718
20190681KR01	Korea, Republic of (KR)	Granted	ALLOY	30-2020-0019876		30-1134267
20190681JP01	Japan	Granted	ALLOY	2020-009624	2020-009624	1680603
20190681EM01	European Union	Granted	3D PRINTER	007954805-0001		007954805-0001
20190681CN01	China	Granted	ALLOY	202030223542.1		ZL202030223542.1
20190681GB01	United Kingdom	Granted	3D PRINTER	90079548050001		90079548050001
20210598US01	United States of America	Application	DISPLAY SCREEN WITH ICON	29/820443		
20210598CN01	China	Application	ELEM X NAMEPLATE PRODUCT IDENTITY - BLACK	202230381951.3		
20210598JP01	Japan	Granted	ELEM X NAMEPLATE PRODUCT IDENTITY - BLACK	2022-013393		1732573
20210598EM01	European Union	Granted	ELEM X NAMEPLATE PRODUCT IDENTITY - BLACK	9068208-0001		9068208-0001
20210598US02	United States of America	Application	RAISED LABEL WITH SURFACE ORNAMENTATION	29/825001		
20210598GB01	United Kingdom	Granted	ICONS FOR DISPLAY SCREENS	6215380		6215380
20210598EM02	European Union	Granted	RAISED LABEL WITH SURFACE ORNAMENTATION	9068216-0001		9068216-0001
20210598GB02	United Kingdom	Granted	RAISED LABEL WITH SURFACE ORNAMENTATION	6215381		6215381
20210598CN02	China	Application	RAISED LABEL WITH SURFACE ORNAMENTATION	202230381956.6		