(12) International Application Status Report

Received at International Bureau: 11 September 2017 (11.09.2017)
Information valid as of: 07 February 2018 (07.02.2018)
Report generated on: 25 August 2019 (25.08.2019)

(10) Publication number:	**(43) Publication date:**	**(26) Publication language:**
WO2019/045733	07 March 2019 (07.03.2019)	English (EN)
(21) Application Number:	**(22) Filing Date:**	**(25) Filing language:**
PCT/US2017/049669	31 August 2017 (31.08.2017)	English (EN)

(51) International Patent Classification:
B33Y 70/00 (2015.01); **B22F 1/00** (2006.01); **B22F 3/00** (2006.01); **B22F 3/10** (2006.01); **B22F 3/12** (2006.01)

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(54) Title (EN): PARTICLE AGGLOMERATION FOR ADDITIVE METAL MANUFACTURING

(54) Title (FR): AGGLOMÉRATION DE PARTICULES POUR LA FABRICATION ADDITIVE DE MÉTAL

(57) Abstract:

(EN): Devices, systems, and methods are directed at spreading sequential layers of powder across a powder bed and applying energy to each layer to form a three-dimensional object. The powder can include granules including agglomerations of metallic particles to facilitate spreading the metallic particles in each layer. The energy can be directed to the powder to reflow the granules in each layer to bind the metallic particles in the layer to one another and to one or more adjacent layers to form the three-dimensional object. Thus, in general, the agglomeration of the metallic particles in the granules can overcome constraints associated with metallic particles that are of a size ordinarily unsuitable for flowing and/or a size that presents safety risks. By overcoming these constraints, the granules can improve formation of dense finished parts from a powder and can result in formation of unique microstructures in finished parts.

(FR): L'invention concerne des dispositifs, des systèmes et des procédés consistant à étaler des couches séquentielles de poudre sur toute l'étendue d'un lit de poudre, et à appliquer de l'énergie sur chaque couche pour former un objet tridimensionnel. La poudre peut comprendre des granules comprenant des agglomérats de particules métalliques qui facilitent l'étalement des particules métalliques dans chaque couche. L'énergie peut être dirigée vers la poudre pour refondre les granules dans chaque couche afin de lier les particules métalliques les unes aux autres dans la couche, et vers une ou plusieurs couche(s) adjacente(s) pour former l'objet tridimensionnel. Ainsi, de manière générale, l'agglomération des particules métalliques dans les granules permet d'éliminer des contraintes associées à des particules métalliques dont la taille est normalement inadéquate pour la fusion et/ou comporte des risques de sécurité. L'élimination de ces contraintes permet aux granules d'améliorer la formation de pièces finies denses à partir d'une poudre, et peuvent entraîner la formation de microstructures uniques dans des pièces finies.

International search report:
Received at International Bureau: 08 January 2018 (08.01.2018) [US]

International Report on Patentability (IPRP) Chapter II of the PCT:
Not available

(81) Designated States:
AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,

KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
European Patent Office (EPO) : AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR
African Intellectual Property Organization (OAPI) : BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG
African Regional Intellectual Property Organization (ARIPO) : BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW
Eurasian Patent Organization (EAPO) : AM, AZ, BY, KG, KZ, RU, TJ, TM