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(54) Title: SYSTEMS AND METHODS FOR CONDUCTING IN-SITU MONITORING IN ADDITIVE MANUFACTURE

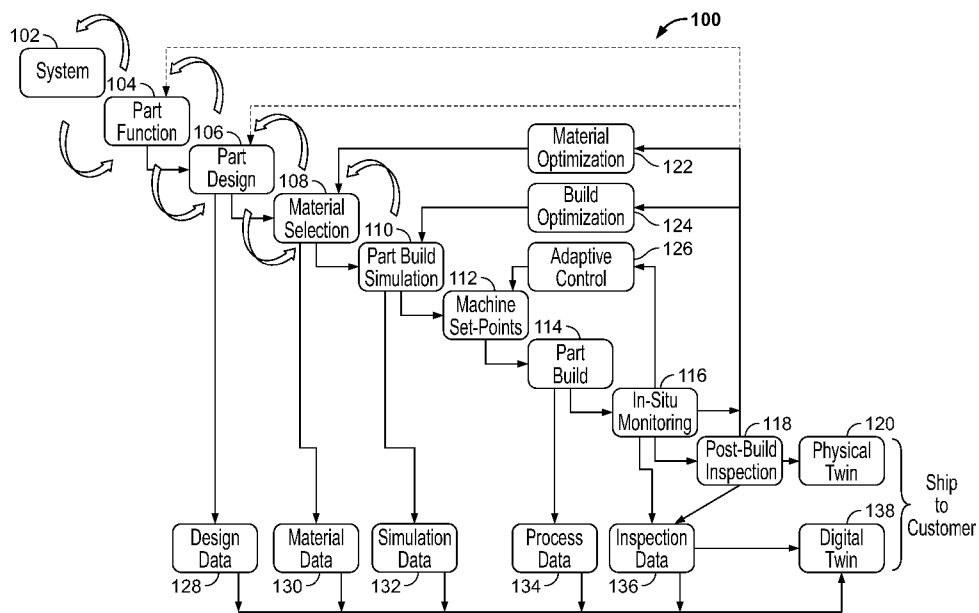


FIG. 1

(57) Abstract: Disclosed are various embodiments of systems and methods for conducting, based at least in part on in-situ monitoring data as input, iterative simulations of various part-build simulation models to generate instructions to an Additive Manufacture ("AM") machine. An embodiment of the present disclosure provides a method that at least includes: building, by the AM machine, an AM part based on a digital twin; monitoring, by an in-situ monitoring sensor, the AM build process; to obtain in-situ monitoring sensing data; determining a discrepancy between the AM part being built and one or more predefined criteria defined based on the digital twin; iteratively simulating an AM simulation model, based on the in-situ monitoring sensing data, to identify an AM process adjustment or a lack of the at least one AM process adjustment; and causing to implement the AM process adjustment by the AM machine to remedy the discrepancy or instructing the AM machine to discharge the AM part.



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**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

B29C 64/386; B22F 3/105; B22F 3/115; B28B 17/00; B29C 64/118; B29C 64/124; B29C 67/00; B33Y 50/02; G05B 19/418; G06F 17/50; B33Y 50/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) &amp; Keywords: additive manufacture, digital twin, monitor, sensor

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2017-0173695 A1 (DESKTOP METAL, INC.) 22 June 2017 See paragraphs [0006], [0008], [0034], [0036], [0108], [0126], [0127], [0136]-[0139], [0153], [0160], [0202]; claim 1.	1-20
Y	US 2016-0311159 A1 (CATERPILLAR INC.) 27 October 2016 See paragraph [0041].	1-20
Y	US 2017-0232515 A1 (SEURAT TECHNOLOGIES, INC.) 17 August 2017 See paragraph [0070]; claim 1.	1-20
A	US 2016-0368220 A1 (XEROX CORPORATION) 22 December 2016 See the entire document.	1-20
A	CN 106827498 A (CHEN, J.) 13 June 2017 See the entire document.	1-20

 Further documents are listed in the continuation of Box C. See patent family annex.

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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CN 106827498 A	13/06/2017	CN 106827498 B	19/03/2019