



US 20150108095A1

(19) **United States**

(12) **Patent Application Publication**
KRUER et al.

(10) **Pub. No.: US 2015/0108095 A1**

(43) **Pub. Date: Apr. 23, 2015**

(54) **METHOD AND APPARATUS FOR
FABRICATION OF ARTICLES BY MOLTEN
AND SEMI-MOLTEN DEPOSITION**

B23K 37/00 (2006.01)

B23K 9/167 (2006.01)

(52) **U.S. CL.**

CPC *B23K 9/044* (2013.01); *B23K 9/1675*
(2013.01); *B23K 9/1735* (2013.01); *B23K*
37/003 (2013.01); *B33Y 10/00* (2014.12)

(71) Applicant: **+Mfg, LLC**, Edgewood, KY (US)

(72) Inventors: **THOMAS R. KRUER**, EDGEWOOD,
KY (US); **JAMES BLACKWOOD**,
FLORENCE, KY (US)

(21) Appl. No.: **14/518,121**

(57) **ABSTRACT**

(22) Filed: **Oct. 20, 2014**

Related U.S. Application Data

(60) Provisional application No. 61/892,526, filed on Oct.
18, 2013.

Publication Classification

(51) **Int. Cl.**

B23K 9/04 (2006.01)

B23K 9/173 (2006.01)

A method and apparatus for depositing metals and metal-like substances in two and three dimensional form without a substrate in a safe, rapid and economical fashion using gas shielded arc welding equipment and programmable robotic motion. The method and apparatus includes the use and application of robotic controls, temperature and position feedback, single and multiple material feeds, and semi liquid deposition thereby creating near net shape parts particularly well suited to rapid prototyping and lower volume production.

