CLAIMS

1. A hopper for powder bed fusion additive manufacturing, the hopper comprising:

a recoater having a volume for holding powder metal therein;

the recoater having a dispensing opening from which powder metal in the volume is deposited onto a powder bed for selective laser melting during powder bed fusion additive manufacturing,

a number of partition dividers separating the volume into a number of separate partitions, wherein the number of separate partitions are arranged along an axis perpendicular to a direction of movement of the hopper, wherein each partition can be filled with powder metal and is in fluid communication with the dispensing opening;

a divider extending between at least two partition dividers of the number of partition dividers, wherein the divider separates at least one partition of the number of separate partitions into a first compartment and a second compartment and separates the dispensing opening into a first opening portion and a second opening portion, wherein the first compartment and the second compartment are arranged along an axis parallel to the direction of movement of the hopper within the at least one partition; and

a first roller arranged in parallel with a second roller, the first roller provided at the first opening portion and the second roller provided at the second opening portion, a longitudinal axis of the first roller being perpendicular to the direction of movement of the hopper during powder metal deposition;

wherein rotation of the first roller and rotation of the second roller dispenses a first powder metal and a second powder metal from the first compartment and the second compartment respectively through the first opening portion and the second opening portion respectively onto the powder bed, and

wherein the first roller and the second roller are configured to rotate selectably and independently of each other.

2. The hopper of claim 1, wherein more than one of the partitions is divided into compartments by the divider.

3. The hopper of claim 1, wherein the number of partition dividers are assembled with a hopper shell to form a hopper assembly, the hopper assembly assembled on the recoater.

4. The hopper of claim 3, wherein the hopper shell has multiple slots configured to engage the number of partition dividers.

5. The hopper of claim 3, further comprising a number of actuators configured to move and reposition the number of partition dividers in the hopper shell.

6. A method of powder bed fusion additive manufacturing using a hopper, wherein the hopper comprises:

a recoater having a volume for holding powder metal therein;

the recoater having a dispensing opening from which powder metal in the volume is deposited onto a powder bed for selective laser melting during powder bed fusion additive manufacturing,

a number of partition dividers separating the volume into a number of separate partitions, wherein the number of separate partitions are arranged along an axis perpendicular to a direction of movement of the hopper, wherein each partition can be filled with powder metal and is in fluid communication with the dispensing opening;

a divider extending between at least two partition dividers of the number of partition dividers, wherein the divider separates at least one partition of the number of separate partitions into a first compartment and a second compartment and separates the dispensing opening into a first opening portion and a second opening portion, wherein the first compartment and the second compartment are arranged along an axis parallel to the direction of movement of the hopper within the at least one partition; and

a first roller arranged in parallel with a second roller, the first roller provided at the first opening portion and the second roller provided at the second opening portion, a longitudinal axis of the first roller being perpendicular to the direction of movement of the hopper during powder metal deposition;

wherein rotation of the first roller and rotation of the second roller dispenses a first powder metal and a second powder metal from the first compartment and the second compartment respectively through the first opening portion and the second opening portion respectively onto the powder bed, and wherein the first roller and the second roller are configured to rotate selectably and independently of each other,

wherein the method comprises:

(a) providing a powder metal of a first material in the first compartment;
(b) providing a powder metal of a second material in the second compartment;
(c) rotating the first roller to deposit the first material during movement of the hopper;
(d) fusing portions of the first material;
(e) rotating the second roller to deposit the second material during movement of the hopper; and
(f) fusing portions of the second material.

7. The method of claim 6, wherein movement of the hopper in step (c) is in a first direction and movement of the hopper in step (e) is in a second direction.

8. The method of claim 6, wherein steps (c) and (d) are repeated after steps (e) and (f).

9. The method of claim 6, wherein steps (c) and (d) are repeated a number of times before steps (e) and (f).

10. The method of claim 6, wherein steps (e) and (f) are repeated a number of times.

11. The method of claim 6, wherein step (e) is performed before step (d) and wherein movement of the hopper in steps (c) and (e) are in a same direction so that the first material and the second material are deposited in a same layer.