CLAIMS

WHAT IS CLAIMED IS:

~~1. A method (300) of aligning a plurality of components for a repair process, the method (300) comprising:~~

~~positioning the plurality of components such that a repair surface of each of the plurality of components contacts an alignment plate (310);~~

~~surrounding the alignment plate with containment walls to define a reservoir, the plurality of components being positioned at least partially within the reservoir (320); and~~

~~dispensing a fill material into the reservoir, the fill material being configured for fixing a relative position of the plurality of components when the fill material is solidified (330).~~

~~2. The method (300) of claim 1, wherein positioning the plurality of components (310) comprises:~~

~~positioning the plurality of components such that the repair face of each of the plurality of components is positioned face down on the alignment plate, the alignment plate at least partially defining the reservoir.~~

~~3. The method (300) of claim 2, further comprising:~~

~~solidifying the fill material to form a fixed component assembly comprising the fill material and the plurality of components (340); and~~

~~removing a top layer of the fill material from the fixed component assembly proximate the repair surface of each of the plurality of components (350).~~

~~4. The method (300) of claim 3, wherein removing the top layer of the fill material (350) comprises:~~

~~melting the top layer of fill material using a heat source.~~

~~5. The method (300) of claim 1, wherein positioning the plurality of components (310) comprises, for each of the plurality of components:~~

~~positioning the component such that the repair surface faces up toward a bottom surface of the alignment plate; and~~

~~urging the component upward with a biasing member to ensure contact between the repair surface and the alignment plate.~~

~~6. The method (300) of claim 5, wherein the biasing member comprises one or more springs, one or more magnet pairs, and/or one or more piezoelectric actuators.~~

~~7. The method (300) of claim 1, wherein the fill material is selected from a group consisting of a potting material, a wax, a photopolymer resin, or molten glass.~~

~~8. The method (300) of claim 1, further comprising:~~

~~solidifying the fill material to form a fixed component assembly comprising the fill material and the plurality of components (340); and~~

~~mounting the fixed component assembly on a build platform, the build platform being movable along a build direction.~~

~~9. The method (300) of claim 8, further comprising:~~

~~depositing a layer of additive powder over the fixed component assembly using a powder dispensing assembly (360); and~~

~~selectively irradiating the layer of additive powder to fuse the layer of additive powder onto the repair surface of each of the plurality of components (370).~~

~~10. The method (300) of claim 1, wherein the plurality of components comprise at least one airfoil of a gas turbine engine.~~

~~11. The method (300) of claim 1, wherein the repair surface is a blade tip of a high pressure compressor blade of a gas turbine engine.~~

~~12~~1. A tooling assembly ~~(200)~~ for fixing a relative position of a plurality of components ~~(70)~~, the tooling assembly ~~(200)~~ comprising:

an alignment plate ~~(202)~~ for receiving the plurality of components (70);

one or more biasing members for urging each of the plurality of components upward to ensure contact between a repair surface of each of the plurality of components and the alignment plate; ~~such that a repair surface (72) of each of the plurality of components (70) contacts the alignment plate (202);~~

a plurality of walls ~~(220)~~ surrounding the alignment plate ~~(202)~~ to define a reservoir ~~(222)~~; and

a fill assembly ~~(210)~~ for dispensing a fill material ~~(212)~~ into the reservoir ~~(222)~~, the fill material ~~(212)~~ fixing a relative position of the plurality of components ~~(70)~~ when solidified~~.~~, wherein the fill material is solidified when the plurality of components are positioned on the alignment plate to form a fixed component assembly;

a cleaning device for removing a top layer of the fill material from the fixed component assembly proximate the repair surface of each of the plurality of components, the cleaning device comprising a heat source for melting the top layer of the fill material or a material removal device, the material removal device being a device configured for grinding, machining, or etching the top layer of the fill material.

2. The tooling assembly of claim 1, wherein the one or more biasing members comprise one or more springs, one or more magnet pairs, or one or more piezoelectric actuators.

3. The tooling assembly of claim 1, wherein the one or more biasing members comprise one or more electromagnets.

4. The tooling assembly of claim 1, wherein the one or more biasing members comprise one or more permanent magnets.

~~13~~5. The tooling assembly ~~(200)~~ of claim ~~12~~1, wherein the plurality of components ~~(70)~~ are positioned such that the repair surface ~~(72)~~ of each of the plurality of components ~~(70)~~ is face down on the alignment plate ~~(202)~~.

6. The tooling assembly of claim 1, wherein the cleaning device comprises the heat source for melting the top layer of the fill material.

~~14~~7. The tooling assembly ~~(200)~~ of claim ~~12~~1, wherein the plurality of components ~~(70)~~ are positioned such that the repair surface ~~(72)~~ of each of the plurality of components ~~(70)~~ is face up toward a bottom surface of the alignment plate ~~(202)~~.

~~15. The tooling assembly (200) of claim 14, further comprising:~~

~~one or more biasing members (262) for urging each of the plurality of components (70) upward to ensure contact between the repair surface (72) of each of the plurality of components (70) and the alignment plate (202~~

8. The tooling assembly of claim 1, wherein the fill material is selected from a group consisting of a potting material, a wax, a photopolymer resin, or molten glass.

9. The tooling assembly of claim 1, wherein the plurality of components comprise at least one airfoil of a gas turbine engine.

10. The tooling assembly of claim 1, wherein the cleaning device comprises the material removal device, the material removal device being the device configured for grinding.

11. A tooling assembly for fixing a relative position of a plurality of components, the tooling assembly comprising:

an alignment plate for receiving the plurality of components such that a repair surface of each of the plurality of components contacts the alignment plate;

one or more biasing members for urging each of the plurality of components upward to ensure contact between the repair surface of each of the plurality of components and the alignment plate;

a plurality of walls surrounding the alignment plate to define a reservoir; and

a fill assembly for dispensing a fill material into the reservoir, the fill material fixing a relative position of the plurality of components when solidified.

12. The tooling assembly of claim 11, wherein the one or more biasing members comprise one or more springs, one or more magnet pairs, or one or more piezoelectric actuators.

13. The tooling assembly of claim 11, wherein the plurality of components are positioned such that the repair surface of each of the plurality of components is face down on the alignment plate.

14. The tooling assembly of claim 11, wherein the fill material is solidified when the plurality of components are positioned face down on the alignment plate to form a fixed component assembly, the tooling assembly further comprising:

a cleaning device for removing a top layer of the fill material from the fixed component assembly proximate the repair surface of each of the plurality of components.

15. The tooling assembly of claim 14, wherein the cleaning device comprises a heat source for melting the top layer of fill material.

16. The tooling assembly of claim 14, wherein the cleaning device comprises a material removal device.

17. The tooling assembly of claim 16, wherein the material removal device comprises a device configured for grinding, machining, or etching the top layer of the fill material.

18. The tooling assembly of claim 11, wherein the plurality of components are positioned such that the repair surface of each of the plurality of components is face up toward a bottom surface of the alignment plate.

19. The tooling assembly of claim 11, wherein the fill material is selected from a group consisting of a potting material, a wax, a photopolymer resin, or molten glass.

20. The tooling assembly of claim 11, wherein the plurality of components comprise at least one airfoil of a gas turbine engine.