CLAIMS

1. A method of embedding one or more fibers in a matrix, the method comprising:

forming the one or more fibers using a fiber extruding tool of an apparatus;

arranging the one or more fibers using one or more physical guides and/ or anchors; and

depositing matrix material over the one or more fibers using a matrix material extruding tool of the apparatus, thereby embedding the one or more fibers in the matrix formed from the matrix material,

~~wherein the matrix material is selected from a group of materials including silicone rubber, fluorosilicone rubber, ethylene-vinyl acetate, silicone polymers, gels, waxes, resins, thermoplastics, clays, or combinations thereof~~wherein the one or more physical guides and/or anchors comprise a weave template with a plurality of poles, and

wherein a pole of the plurality of poles is used as an anchor point to fix an end of a fiber of the one or more fibers by coiling the fiber around the pole with a minimum of three full revolutions, the fiber of the one or more fibers being kept in tension between the pole and a further pole of the plurality of poles.

~~2. The method according to claim 1,~~

~~wherein the one or more physical guides and/or anchors comprise a weave template with a plurality of poles.~~

~~3. The method according to claim 2,~~

~~wherein a pole of the plurality of poles is used as an anchor point to fix an end of a fiber of the one or more fibers.~~

~~4.~~2.The method according to claim ~~2~~1,

wherein ~~a pole of the plurality of poles~~the further pole is used as a nodal point to change a direction of ~~a~~the fiber of the one or more fibers.

~~5.~~3.The method according to ~~any one of claims 2 to 4~~claim 1 or claim 2,

wherein the weave template is formed by fused deposition modelling (FDM).

~~6.~~4.The method according to any one of claims ~~2~~1 to ~~5~~3, further comprising:

forming a first mold part defined by a bottom mold before forming the one or more fibers;

wherein the one or more fibers are arranged on the first mold part; and

wherein the matrix is a second mold part defined by a top mold so that the one or more fibers are between the first mold part and the second mold part.

~~7.~~5.~~A~~The method ~~of embedding one or more fibers in a matrix, the method comprising:~~according to claim 1,

~~forming the one or more fibers using a fiber extruding tool of an apparatus;~~

~~arranging the one or more fibers using one or more physical guides and/ or anchors; and~~

~~depositing matrix material over the one or more fibers using a matrix material extruding tool of the apparatus, thereby embedding the one or more fibers in the matrix formed from the matrix material,~~

~~wherein the matrix material is selected from a group of materials including silicone rubber, fluorosilicone rubber, ethylene-vinyl acetate, silicone polymers, gels, waxes, resins, thermoplastics, clays, or combinations thereof,~~

wherein the one or more physical guides and/or anchors comprise a sheet template with a plurality of line cuts or holes along one or more edges of the sheet template.

~~8.~~6.The method according to claim ~~7~~5,

wherein a line cut or hole of the plurality of line cuts or holes is used as an anchor point to fix an end of a fiber of the one or more fibers.

~~9.~~7.The method according to claim ~~7~~5,

wherein a line cut or hole of the plurality of line cuts or holes is used as a nodal point to change a direction of a fiber of the one or more fibers.

~~10.~~8. The method according to any one of claims ~~7~~5 to ~~9~~7,

wherein the plurality of line cuts or holes is formed by using a laser cutter.

~~11.~~9. The method according to claim 1,

wherein the one or more physical guides and/or anchors comprise polymer guides printed as ~~a~~ new parts or onto an existing surface or an object.

~~12.~~10. The method according to claim ~~11~~9,

wherein arranging the one or more fibers comprises layering the one or more fibers between or inside the guides using a needle and/or a co-axial needle.

~~13.~~11. The method according to any one of claims 1 to ~~12~~10,

wherein depositing the matrix material over the fibers comprises pouring the matrix material over the one or more fibers after arranging the fibers or while arranging the fibers.

~~14.~~12. The method according to any one of claims 1 to ~~12~~10,

wherein depositing the matrix material over the fibers comprises printing the matrix material layer by layer using direct ink writing (DIW).

~~15.~~13. The method according to any one of claims 1 to ~~14~~12, further comprising:

heating the matrix material after depositing the matrix material to form the matrix.

~~16.~~14. A setup for embedding one or more fibers in a matrix, the setup comprising:

an apparatus comprising a fiber extruding tool configured to form the one or more fibers;

one or more physical guides and/or anchors used for arranging the one or more fibers;

wherein the apparatus further comprises a matrix material extruding tool configured to deposit matrix material over the one or more fibers, thereby embedding the one or more fibers in the matrix formed from the matrix material,

~~wherein the matrix material is selected from a group of materials including silicone rubber, fluorosilicone rubber, ethylene-vinyl acetate, silicone polymers, gels, waxes, resins, thermoplastics, clays, or combinations~~

~~thereof~~wherein the one or more physical guides and/or anchors comprise a weave template with a plurality of poles, and

wherein a pole of the plurality of poles is used as an anchor point to fix an end of a fiber of the one or more fibers by coiling the fiber around the pole of the plurality of poles with a minimum of three full revolutions, the fiber of the one or more fibers being kept in tension between the pole and a further pole of the plurality of poles.

~~17. The setup according to claim 16, comprising a cutting device configured to cut the fiber after embedding of the one or more fibers, the cutting device being a laser cutter.~~

~~18. The method according to any of claims 2 to 5, wherein the one or more physical guides and/ or anchors comprise poles with a spacing between them to allow a needle of the fiber extruding tool and the one or more fibers to pass through.~~

~~19. The method according to claim 1, wherein the embedded one or more fibers are held in tension by the one or more physical guides and/ or anchors until the matrix material cures into fiber composite structure.~~

~~20. The method according to claim 1, wherein arranging the one or more fibers using one or more physical guides and/ or anchors comprises coiling the one or more fibers around the one or more physical guides and/ or anchors with more than one revolutions.~~