Claims

1. A mounting device for removably mounting a fan unit directly to the mounting device, the mounting device comprising:

a reference plane and a reference axis normal to the reference plane, the fan unit being receivable towards the reference plane along the reference axis when the fan unit is in a disengaged orientation;

a set of engagement members radially disposed around the reference axis and arranged to surround the fan unit when the fan unit is in the disengaged orientation at the reference plane, the engagement members engageable with the fan unit upon rotation of the fan unit along a first rotational direction about the reference axis from the disengaged orientation to an engaged orientation; and

a set of engagement elements disposed on the engagement members, the engagement elements engageable within a set of mounting holes of the fan unit when the fan unit is at the reference plane and upon rotation of the fan unit to the engaged orientation,

wherein upon engagement with the fan unit when the fan unit is in the engaged orientation, the engaged engagement members resist movement of the fan unit along the reference axis and the engaged engagement elements resist rotation of the fan unit about the reference axis; and

wherein the engagement members are configured to prevent engagement of the fan unit upon rotation of the fan unit from the disengaged orientation along a second rotational direction opposing to the first rotational direction.

2. The mounting device according to claim 1, comprising a plurality of engagement members angularly separated from each other about the reference axis.

3. The mounting device according to claim 2, comprising a plurality of engagement elements angularly separated from each other about the reference axis and engageable within a plurality of mounting holes of the fan unit.

4. The mounting device according to any one of claims 1 to 3, wherein each engagement member comprises a barrier to prevent engagement of the fan unit upon rotation of the fan unit from the disengaged orientation along the second rotational direction, and to prevent further rotation of the fan unit along the first rotational direction upon engagement with the fan unit.

5. The mounting device according to any one of claims 1 to 4, further comprising side surfaces for guiding rotation of the fan unit.

6. The mounting device according to any one of claims 1 to 5, wherein an engagement member comprises a side wall and at least one bracket extending from the side wall.

7. The mounting device according to claim 6, wherein the at least one bracket comprises a top bracket and/or a bottom bracket.

8. The mounting device according to claim 7, wherein the top bracket includes a metallic material.

9. The mounting device according to any one of claims 1 to 8, wherein an engagement member comprises a weakening or stiffening element for increasing or decreasing, respectively, a stiffness of the engagement member.

10. The mounting device according to any one of claims 1 to 9, wherein an engagement member comprises an extension mechanism for adjusting an engagement distance of the engagement member, optionally wherein the extension mechanism comprises a threaded member.

11. The mounting device according to any one of claims 1 to 10, wherein one or more of the following apply:

(a) the engagement members and/or engagement elements include a resilient material within a hardness range of Shore D 30 to 70;

(b) the engagement elements include a resilient material within a hardness range of Shore A 20 to 70; and

(c) the mounting device include an interfacing material for interfacing between the fan unit and engagement members, the interfacing material within a hardness range of Shore 00 0 to 40.

12. A method of removably mounting a fan unit directly to a mounting device, the method comprising:

displacing the fan unit in a disengaged orientation and along a reference axis towards a reference plane of the mounting device when the fan unit is in a disengaged orientation, the reference axis being normal to the reference plane;

surrounding the fan unit, when the fan unit is in the disengaged orientation at the reference plane, with a set of engagement members of the mounting device radially disposed around the reference axis;

rotating the fan unit along a first rotational direction about the reference axis from the disengaged orientation to an engaged orientation;

engaging the engagement members with the fan unit upon the fan unit being rotated to the engaged orientation;

engaging a set of engagement elements of the mounting device within a set of mounting holes of the fan unit upon rotation of the fan unit to the engaged orientation, the engagement elements disposed on the engagement members; and

preventing, by the engagement members, engagement of the fan unit upon rotation of the fan unit from the disengaged orientation along a second rotational direction opposing to the first rotational direction,

wherein upon engagement with the fan unit when the fan unit is in the engaged orientation, the engaged engagement members resist movement of the fan unit along the reference axis and the engaged engagement elements resist rotation of the fan unit about the reference axis.

13. The method according to claim 12, comprising:

preventing, by a barrier of each engagement member, engagement of the fan unit upon rotation of the fan unit from the disengaged orientation along the second rotational direction; and

preventing further rotation of the fan unit along the first rotational direction upon engagement with the fan unit.

14. A fan-mounted product comprising:

a body;

a mounting device joined to the body;

a fan unit removably mounted to the mounting device, the fan unit comprising a set of mounting holes;

the mounting device comprising:

a reference plane and a reference axis normal to the reference plane;

a set of engagement members radially disposed around the reference axis and surrounding the fan unit in an engaged orientation at the reference plane, the engagement members engaged with the fan unit; and

a set of engagement elements disposed on the engagement members and engaged within the mounting holes of the fan unit;

wherein the engaged engagement members resist movement of the fan unit along the reference axis and the engaged engagement elements resist rotation of the fan unit about the reference axis;

wherein the fan unit is engaged with the engagement members and engagement elements by rotating the fan unit along a first rotational direction about the reference axis;

wherein the fan unit is disengageable by rotating the fan unit, along a second rotational direction opposing to the first rotational direction, from the engaged orientation to a disengaged orientation;

wherein the fan unit is removable from the mounting device by displacing the fan unit along the reference axis away from the reference plane when the fan unit is in the disengaged orientation; and

wherein the engagement members are configured to prevent engagement of the fan unit upon rotation of the fan unit from the disengaged orientation along the second rotational direction.

15. The fan-mounted product according to claim 14, wherein the mounting device is integrally formed with the body.

16. The fan-mounted product according to claim 14 or 15, wherein each engagement member comprises a barrier to prevent engagement of the fan unit upon rotation of the fan unit from the disengaged orientation along the second rotational direction, and to prevent further rotation of the fan unit along the first rotational direction when the fan unit is engaged with the mounting device.

17. The fan-mounted product according to any one of claims 14 to 16, wherein the fan-mounted product is a fuel cell system comprising a stack of fuel cells, optionally wherein the fan unit is configured for delivering cooling air and oxidant to the fuel cells.

18. The fan-mounted product according to claim 17, wherein the fuel cell system further comprises a primary oxidant source for delivering oxidant to the fuel cells, optionally wherein the fuel cell system further comprises a liquid coolant device for liquid cooling the fuel cells.

19. A computer program comprising computer executable instructions that, when executed by a processor, cause the processor to control an additive manufacturing apparatus to manufacture a product comprising the mounting device according to any one of claims 1 to 11.

20. A method of manufacturing a product via additive manufacturing, the method comprising:

obtaining an electronic file representing a geometry of the product wherein the product comprises the mounting device according to any one of claims 1 to 11; and

controlling an additive manufacturing apparatus to manufacture, over one or more additive manufacturing steps, the product according to the geometry specified in the electronic file.

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