CLAIMS

What is claimed is:

1. A portable fan, comprising:

an airflow portion, comprising rotation air blades and a drive portion that is driveably connected to the rotation air blades, wherein the drive portion is a three-phase motor that is configured to drive the rotation air blades to rotate to generate an airflow;

a handheld portion, connected to the airflow portion, wherein a power supply assembly is arranged inside the handheld portion; and the power supply assembly is electrically connected to and supply power to the three-phase motor.

2. The portable fan according to claim 1, further comprising: an air duct portion, wherein,

the air duct portion comprises a body portion, the body portion defines an air guiding cavity therein; the air duct portion defines an air outlet and an air inlet respectively at opposite ends thereof; the air outlet and the air inlet are communicated to the air guiding cavity; and a positioning protruding post is arranged inside the body portion;

and/or

the portable fan further comprises a mix-flow fan, a pressurizing member, and a booster; wherein the mix-flow fan has an airflow guiding surface configured to guide the airflow, a portion of the airflow guiding surface and/or a portion of a pressurizing surface of the pressurizing member near the mix-flow fan is recessed towards a rotation shaft of the mix-flow fan, another portion of the pressurizing surface away from the mix-flow fan is extending approaching an edge of a housing of the portable fan at the air outlet.

3. The portable fan according to claim 2, wherein,

the body portion comprises a first housing and a second housing connected to the first housing; the air guiding cavity is formed between the first housing and the second housing; the first housing defines the air inlet; the second housing defines the air outlet; the positioning protruding post is arranged on the second housing and extends along an extension direction of the air guiding cavity.

4. The portable fan according to claim 2 or 3, wherein, the rotation air blades are rotatably received in the air guiding cavity and are arranged facing towards the air outlet;

the three-phase motor comprises a stator and a rotor sleeving an outside of the stator; the rotor is fixedly mounted on the rotation air blades and is coaxially arranged with the rotation air blades; the stator fixedly sleeves the positioning protruding post.

5. The portable fan according to claim 4, wherein

the rotation air blades define a fixation hole, an axis of the fixation hole coincides with an axis of the rotation air blades; the airflow portion further comprises a rotation shaft; a first end of the rotation shaft is fixedly received in the fixation hole; a positioning hole is defined inside the positioning protruding post; an axis of the positioning hole coincides with an axis of the rotation shaft; a second end of the rotation shaft is rotatably received in the positioning hole.

6. The portable fan according to claim 5, wherein,

the airflow portion further comprises a bearing portion; an outer ring of the bearing portion is fixed in the positioning hole; and an inner ring of the bearing portion sleeves the second end of the rotation shaft; the bearing portion comprises a rolling bearing;

the airflow portion further comprises a limiting member; the limiting member is mounted at the second end of the rotation shaft; the bearing portion is disposed between the limiting member and the first end of the rotation shaft; the bearing portion comprises a plurality of bearing portions; an inner flange is arranged on an inner wall of the positioning hole; the inner flange is disposed between two adjacent bearing portions of the plurality of bearing portions to arrange the two adjacent bearing portions to be spaced apart from each other; the bearing portion comprises a slide bearing; the airflow portion further comprises two sealing rings; the two sealing rings both sleeve the rotation shaft and are respectively located at two sides of the slide bearing.

7. The portable fan according to any one of claims 3 to 6, wherein,

the handheld portion comprises a third housing and a fourth housing connected to the third housing; the first housing comprises a housing body and an air duct liner; the air duct liner is mounted on the housing body; an air duct is defined inside the air duct liner; and the air guiding cavity is formed between the air duct liner and the second housing.

8. The portable fan according to any one of claims 2 to 7, wherein,

the handheld portion is arranged with a charging port; the charging port is electrically connected to the power supply assembly.

9. The portable fan according to any one of claims 2 to 7, wherein,

the air duct portion and the handheld portion are fixedly or pivotally connected to each other.

10. The portable fan according to any one of claims 1 to 9, wherein, a control circuit of the portable fan comprises:

a charging and power supply circuit the charging and power supply circuit is configured to be electrically connected to an external power source and the power supply assembly to receive an external voltage to charge the power supply assembly and to output a power supply voltage;

a fan drive circuit, electrically connected with the charging and power supply circuit and the rotation air blades to drive the rotation air blades to rotate;

a control switch, wherein a control end of the control switch is configured to receive the external voltage and is grounded; a first conductive end of the control switch is electrically connected to the power supply assembly to receive an output voltage from the power supply assembly; a second conductive end of the control switch is electrically connected to the fan drive circuit; the control switch is disconnected when receiving the external voltage and is conducted when not receiving the external voltage; and

a master control circuit, electrically connected to the charging and power supply circuit, the fan drive circuit and the control switch.

11. A portable fan, comprising:

an airflow portion, comprising rotation air blades and a drive portion that is driveably connected to the rotation air blades, wherein the drive portion is a three-phase motor that is configured to drive the rotation air blades to rotate to generate an airflow;

a handheld portion, connected to the airflow portion, wherein a switch is arranged inside the handheld portion and is an infinite speed adjustment switch.

12. The portable fan according to claim 11, wherein the infinite speed adjustment switch is configured to infinitely adjust a rotation speed of the rotation air blades driven by the three-phase motor;

and/or

the portable fan further comprises a mix-flow fan, a pressurizing member, and a booster; wherein the mix-flow fan has an airflow guiding surface configured to guide the airflow, a portion of the airflow guiding surface and/or a portion of a pressurizing surface of the pressurizing member near the mix-flow fan is recessed towards a rotation shaft of the mix-flow fan, another portion of the pressurizing surface away from the mix-flow fan is extending approaching an edge of a housing of the portable fan at the air outlet.

13. The portable fan according to claim 12 or 11, further comprising: an air duct portion, wherein,

the air duct portion comprises a body portion, the body portion defines an air guiding cavity therein; the air duct portion defines an air outlet and an air inlet respectively at opposite ends thereof; the air outlet and the air inlet are communicated to the air guiding cavity; the rotation air blades are rotatably received in the air guiding cavity and are arranged facing towards the air outlet; and a positioning protruding post is arranged inside the body portion.

14. The portable fan according to any one of claims 11 to 13, wherein the handheld portion defines a mounting cavity; a power supply assembly is received in the mounting cavity; and the power supply assembly is electrically connected to the three-phase motor.

15. The portable fan according to claim 14, wherein,

the handheld portion is arranged with a charging port; the charging port is electrically connected to the power supply assembly.

16. The portable fan according to any one of claims 11 to 15, wherein

the rotation air blades defines a fixation hole, an axis of the fixation hole coincides with an axis of the rotation air blades; the airflow portion further comprises a rotation shaft; a first end of the rotation shaft is fixedly received in the fixation hole; a positioning hole is defined inside the positioning protruding post; an axis of the positioning hole coincides with an axis of the rotation shaft; a second end of the rotation shaft is rotatably received in the positioning hole.

17. The portable fan according to claim 16, wherein,

the airflow portion further comprises a bearing portion; an outer ring of the bearing portion is fixed in the positioning hole; and an inner ring of the bearing portion sleeves the second end of the rotation shaft; the bearing portion comprises a rolling bearing; the airflow portion further comprises a limiting member; the limiting member is mounted at the second end of the rotation shaft; the bearing portion is disposed between the limiting member and the first end of the rotation shaft; the bearing portion comprises a plurality of bearing portions; an inner flange is arranged on an inner wall of the positioning hole; the inner flange is disposed between two adjacent bearing portions of the plurality of bearing portions to arrange the two adjacent bearing portions to be spaced apart from each other; the bearing portion comprises a slide bearing; the airflow portion

further comprises two sealing rings; the two sealing rings both sleeve the rotation shaft and are respectively located at two sides of the slide bearing.

18. The portable fan according to claim 11, wherein, the three-phase drive circuit comprises a first transistor, a second transistor, a third transistor, a fourth transistor, a fifth transistor, a sixth transistor, a seventh transistor, an eighth transistor, and a ninth transistor;

a first conductive end of the first transistor, a first conductive end of the second transistor, and a first conductive end of the third transistor are connected to a power supply end; a first conductive end of the fourth transistor is connected to the power supply end; a first conductive end of the fifth transistor is connected to the power supply end; a first conduction end of the sixth transistor is connected to the power supply end;

a control end of the fourth transistor, a control end of the fifth transistor, and a control end of the sixth transistor are electrically connected to the master control circuit; a control end of the seventh transistor is electrically connected to the control end of the fourth transistor, a control end of the eighth transistor is electrically connected to the control end of the fifth transistor, and a control end of the ninth transistor is electrically connected to the control end of the sixth transistor, so as to receive the control signals;

second conduction ends of the fourth transistor, the fifth transistor, and the sixth transistor are grounded; a first conductive end of the seventh transistor is connected to a second conductive end of the first transistor; a second conductive end of the seventh transistor is grounded; a first conductive end of the eighth transistor is connected to a second conductive end of the second transistor; a second conductive end of the eighth transistor is grounded; a first conductive end of the ninth transistor is connected to the second conductive end of the third transistor; a second conductive end of the ninth transistor is grounded;

a node between the first conductive of the seventh transistor and the second conductive of the first transistor, a node between the first conductive of the eighth transistor and the second conductive of the second transistor, and a node between the first conductive of the ninth transistor and the second conductive of the third transistor respectively serve as the three drive signal output ends;

the at least three signal input ends are three PWM signal input ends; and the control signals comprise three PWM signals;

the fan drive circuit further comprises a current detection circuit; the second conductive ends of the seventh transistor, the eighth transistor, and the ninth transistor are all grounded via the current detection circuit;

the current detection circuit is electrically connected to the master control circuit; the current detection circuit comprises a sense resistor and a sense capacitor; the second conductive ends of the seventh transistor, the eighth transistor, and the ninth transistor are grounded via the sense resistor and the sense capacitor sequentially.

19. A portable fan, comprising:

an air duct portion, comprising a body portion, wherein the body portion defines an air guiding cavity therein; the air duct portion defines an air outlet and an air inlet respectively at opposite ends thereof; the air outlet and the air inlet are communicated to the air guiding cavity, and a positioning protruding post is arranged inside the body portion;

an airflow portion, comprising rotation air blades and a drive portion that is driveably connected to the rotation air blades, wherein the rotation air blades are rotatably received in the air guiding cavity and are arranged facing towards the air outlet; the drive portion comprises a stator and a rotor sleeving an outside of the stator; the rotor is fixedly mounted on the rotation air blades and is coaxially arranged with the rotation air blades; the stator fixedly sleeves the positioning protruding post; and the drive portion is a three-phase motor;

a handheld portion, connected to the air duct portion, wherein the handheld portion defines a mounting cavity; a power supply assembly is received in the mounting cavity; and the power supply assembly is electrically connected to the drive portion;

wherein, the handheld portion is arranged with a charging port; the charging port is electrically connected to the power supply assembly; and/or the air duct portion and the handheld portion are fixedly or pivotally connected to each other.

20. The portable fan according to claim 19, wherein

the rotation air blades defines a fixation hole, an axis of the fixation hole coincides with an axis of the rotation air blades; the airflow portion further comprises a rotation shaft; a first end of the rotation shaft is fixedly received in the fixation hole; a positioning hole is defined inside the positioning protruding post; an axis of the positioning hole coincides with an axis of the rotation shaft; a second end of the rotation shaft is rotatably received in the positioning hole;

and/or

the portable fan further comprises a mix-flow fan, a pressurizing member, and a booster; wherein the mix-flow fan has an airflow guiding surface configured to guide the airflow, a portion of the airflow guiding surface and/or a portion of a pressurizing surface of the pressurizing member near the mix-flow fan is recessed towards a rotation shaft of the mix-flow fan, another portion of

the pressurizing surface away from the mix-flow fan is extending approaching an edge of a housing of the portable fan at the air outlet.