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(54) POWER ADAPTER FOR ELECTRIC TOOL

(57) The present disclosure belongs to the technical field of electric tools, in particular to a power adapter for an electric tool. The power adapter for an electric tool includes a main body and a power wire. One end of the power wire is connected with the main body, and the other end of the power wire is provided with a pin for connecting a socket. The main body is provided with a jack for connecting the electric tool. The main body can be connected with a battery pack jack on the electric tool through the jack. The main body is internally provided with a step-down circuit board. The step-down circuit board converts household high-voltage electricity into low-voltage electricity and outputs the low-voltage electricity to the electric tool connected with the step-down circuit board for power supply. The power adapter for an electric tool is suitable for any electric tool with a battery pack, and is extremely high in applicability without the need of buying additional electric tools, so that the original low-voltage electric tool can be directly connected to alternating current for use when the battery pack is out of power or when there is a power socket nearby.

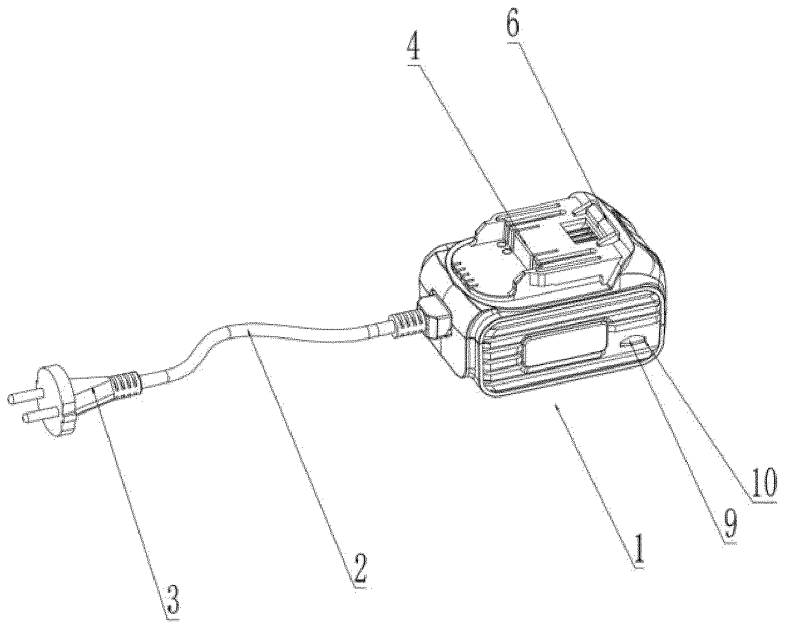

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present disclosure belongs to the technical field of electric tools, in particular to a power adapter for an electric tool.

BACKGROUND

[0002] The electric tool is a machine tool which is powered by a motor and drives different working heads to work through a transmission mechanism. At present, there are many kinds of electric tools on the market, such as electric drills, electric hammers, angle grinders, electric chain saws, electric shrub and hedge trimmers, percussion drills, punching machines, electric circular saws, electric wrenches, electric jig saws and so on.

[0003] Most electric tools are classified into high-voltage electric tools and low-voltage electric tools. The high-voltage electric tool is powered by high-voltage alternating current connected to the power connection wire, such as 220V, 110V and 380V conventional household electricity all over the world. However, since the power connection wire needs to be plugged into the socket for use, there are many restrictions when in use, and the electric tool cannot be used in many scenarios. For example, the electric tool cannot be used when working outdoors. Because there are many restrictions on the high-voltage electric tools, there are currently more and more low-voltage electric tools. The low-voltage electric tool is powered by a light and easy-to-carry lithium battery pack. The battery pack is removable. When the battery pack is out of power, the battery pack needs to be detached for charging. The battery pack cannot work during charging, and the work continuity is poor. Therefore, a power adapter which can be normally used when a low-voltage electric tool is connected to alternating current is needed at present.

[0004] Therefore, a power adapter which can be normally used when a lithium-battery electric tool is connected to alternating current is needed at present.

SUMMARY

[0005] The present disclosure aims to provide a power adapter which is simple in structure and can be normally used when a lithium-battery electric tool is connected to alternating current.

[0006] The purpose of the present disclosure is realized as follows.

[0007] A power adapter for an electric tool includes a main body and a power wire. One end of the power wire is connected with the main body, and the other end of the power wire is provided with a pin for connecting a socket. The main body is provided with a jack for connecting the electric tool. The main body can be connected with a battery pack jack on the electric tool through the jack. The main body is internally provided with a step-down circuit board. The step-down circuit board converts household high-voltage electricity into low-voltage electricity and outputs the low-voltage electricity to the electric tool connected with the step-down circuit board for power supply.

[0008] Further, a fixed buckle is arranged at the jack. The fixed buckle includes a limit buckle and a pressing part. The jack is clamped to the electric tool through the limit buckle. The limit buckle can be driven to move by pressing the pressing part, and the jack is separated from the electric tool.

[0009] Further, the step-down circuit board is provided with a step-down adjusting knob. An adjusting hole is formed in the main body. The part of the step-down adjusting knob is exposed out of the main body from the adjusting hole. The voltage input by the jack can be adjusted by rotating the step-down adjusting knob.

[0010] Further, a power wire interface is formed in the main body. The power wire is provided with a connector. The power wire is detachably connected to the main body through the connector.

[0011] Compared with the prior art, the present disclosure has the following outstanding and beneficial effects.

[0012] The present disclosure refers to a power adapter used for an electric tool, specifically a power adapter capable of normally used when an electric tool with a battery pack is connected to alternating current. The power adapter for an electric tool is suitable for any electric tool with a battery pack, and is extremely high in applicability without the need of buying additional electric tools, so that the original low-voltage electric tool can be directly connected to alternating current for use when the battery pack is out of power or when there is a power socket nearby. The electric tool can be used not only with a battery pack, but also with a power adapter connected to alternating current. The specific structure of the power adapter includes a main body for accommodating the step-down circuit board. The main body is connected with an input end and an output end. The input end is connected with high-voltage alternating current. The alternating current flows to the step-down circuit board for rectification and transformation, so that 220V alternating current is converted into 12V, 24V or 36V direct current. The converted low-voltage direct current is directly connected with the electric tool through the jack, and the converted output direct current is the same as the original output voltage of the battery pack. Therefore, the power adapter can be used without changing the internal circuit structure of the electric tool, which is very convenient.

[0013] As a preferred embodiment, the output end can be a connection jack formed on the main body of the adapter, so that the main body of the adapter looks like a battery pack in shape, and the connection jack is also the same as the jack on the battery pack, so that the main body of the adapter can be fixed on the battery pack jack on the electric tool through the connection jack. A power

supply connection wire is connected to the main body of the adapter again. The power supply connection wire is an input end for connecting alternating current. The other end of the power supply connection wire is connected with a pin.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

FIG. 1 is a first structural schematic diagram of the present disclosure.
FIG. 2 is a second structural schematic diagram of the present disclosure.
FIG. 3 is a side view of the present disclosure.
FIG. 4 is a first structural schematic diagram of a main body in the present disclosure.
FIG. 5 is a second structural schematic diagram of a main body in the present disclosure.
FIG. 6 is a structural schematic diagram of a power wire in the present disclosure.
FIG. 7 is a schematic diagram of a disconnected state of a main body and a power wire in the present disclosure.
FIG. 8 is a structural schematic diagram of a main body from which a part of a shell is detachable in the present disclosure.
FIG. 9 is a structural schematic diagram of a step-down circuit board in the present disclosure.

[0015] Reference signs:
1, main body; 2, power wire; 3, pin; 4, jack; 5, step-down circuit board; 6, fixed buckle; 7, limit buckle; 8, pressing part; 9, step-down adjusting knob; 10, adjusting hole; 11, power wire interface; and 12, connector.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0016] The description of the present disclosure is further described in conjunction with the following specific embodiments.

[0017] A power adapter for an electric tool includes a main body and a power wire. One end of the power wire is connected with the main body, and the other end of the power wire is provided with a pin for connecting a socket. The main body is provided with a jack for connecting the electric tool. The main body can be connected with a battery pack jack on the electric tool through the jack. The main body is internally provided with a step-down circuit board. The step-down circuit board converts household high-voltage electricity into low-voltage electricity and outputs the low-voltage electricity to the electric tool connected with the step-down circuit board for power supply.

[0018] The present disclosure refers to a power adapter used for an electric tool, specifically a power adapter capable of normally used when an electric tool with a battery pack is connected to alternating current. The power adapter for an electric tool is suitable for any electric tool with a battery pack, and is extremely high in applicability without the need of buying additional electric tools, so that the original low-voltage electric tool can be directly connected to alternating current for use when the battery pack is out of power or when there is a power socket nearby. The electric tool can be used not only with a battery pack, but also with a power adapter connected to alternating current. The specific structure of the power adapter includes a main body for accommodating the step-down circuit board. The main body is connected with an input end and an output end. The input end is connected with high-voltage alternating current. The alternating current flows to the step-down circuit board for rectification and transformation, so that 220V alternating current is converted into 12V, 24V or 36V direct current. The converted low-voltage direct current is directly connected with the electric tool through the jack, and the converted output direct current is the same as the original output voltage of the battery pack. Therefore, the power adapter can be used without changing the internal circuit structure of the electric tool, which is very convenient.

[0019] As a preferred embodiment, the output end can be a connection jack formed on the main body of the adapter, so that the main body of the adapter looks like a battery pack in shape, and the connection jack is also the same as the jack on the battery pack, so that the main body of the adapter can be fixed on the battery pack jack on the electric tool through the connection jack. A power supply connection wire is connected to the main body of the adapter again. The power supply connection wire is an input end for connecting alternating current. The other end of the power supply connection wire is connected with a pin.

[0020] As a preferred embodiment of the present disclosure, a fixed buckle is arranged at the jack. The fixed buckle includes a limit buckle and a pressing part. The jack is clamped to the electric tool through the limit buckle. The limit buckle can be driven to move by pressing the pressing part, and the jack is separated from the electric tool. The fixed buckle is used for fixing the jack. The jack can be extremely stable during connection, and is not prone to fall off from the electric tool. The jack is also extremely easy and quick when the jack needs to be disassembled.

[0021] As a preferred embodiment of the present disclosure, the step-down circuit board is provided with a step-down adjusting knob. An adjusting hole is formed in the main body. The part of the step-down adjusting knob is exposed out of the main body from the adjusting hole. The voltage input by the jack can be adjusted by rotating the step-down adjusting knob. Different electric tools need different working voltages, and the power adapter is provided with a step-down circuit board which can adjust the output voltage in the main body, so the step-down circuit board can adjust the converted output voltage. Different output voltages are adjusted according to

different electric tools. The adjustable range can reach 1.5V to 48V, the working voltages of most electric tools are basically covered, and the applicability is high. Moreover, the step-down circuit board also belongs to the general technology of the transformer industry, and has been widely used. The technology is relatively mature, so the production cost of the power adapter will be lower.

[0022] As a preferred embodiment of the present disclosure, a power wire interface is formed in the main body. The power wire is provided with a connector. The power wire is detachably connected to the main body through the connector. The power wire can be detached from the main body. The main body can also be connected to the electric tool all the time without the need of connecting the power wire all the time, and it is also very convenient to plug in the power wire when the power adapter needs to be powered on.

[0023] The above embodiment is only a better embodiment of the present disclosure, and does not limit the protection range of the present disclosure, so that equivalent changes made according to the structure, shape and principle of the present disclosure should be covered in the protection range of the present disclosure.

Claims

1. A power adapter for an electric tool, comprising a main body and a power wire, wherein one end of the power wire is connected with the main body, and the other end of the power wire is provided with a pin for connecting a socket, the main body is provided with a jack for connecting the electric tool, the main body can be connected with a battery pack jack on the electric tool through the jack, the main body is internally provided with a step-down circuit board, and the step-down circuit board converts household high-voltage electricity into low-voltage electricity and outputs the low-voltage electricity to the electric tool connected with the step-down circuit board for power supply.

2. The power adapter for an electric tool according to claim 1, wherein a fixed buckle is arranged at the jack, the fixed buckle comprises a limit buckle and a pressing part, the jack is clamped to the electric tool through the limit buckle, the limit buckle can be driven to move by pressing the pressing part, and the jack is separated from the electric tool.

3. The power adapter for an electric tool according to claim 1 or 2, wherein the step-down circuit board is provided with a step-down adjusting knob, an adjusting hole is formed in the main body, the part of the step-down adjusting knob is exposed out of the main body from the adjusting hole, and the voltage input by the jack can be adjusted by rotating the step-down adjusting knob.

4. The power adapter for an electric tool according to claim 3, wherein a power wire interface is formed in the main body, the power wire is provided with a connector, and the power wire is detachably connected to the main body through the connector.

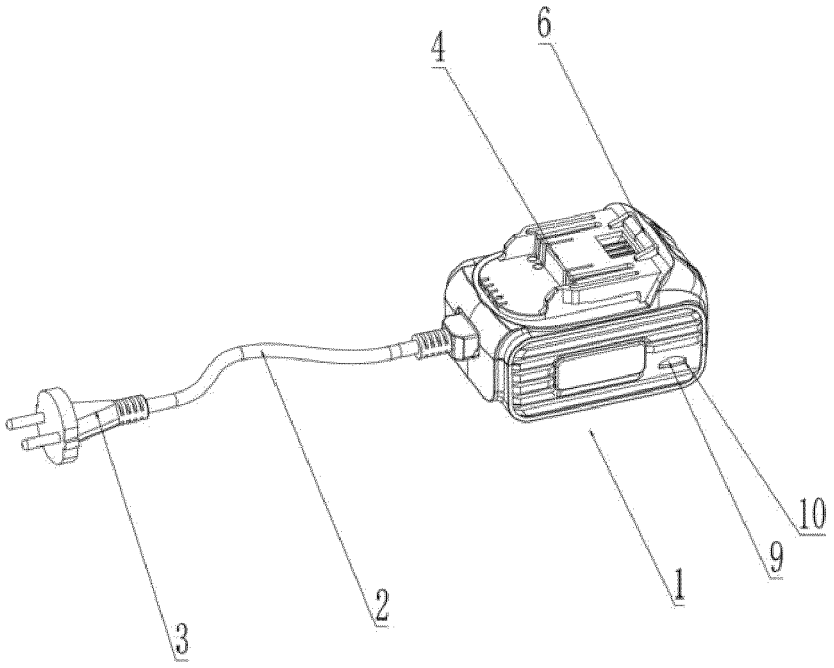

FIG. 1

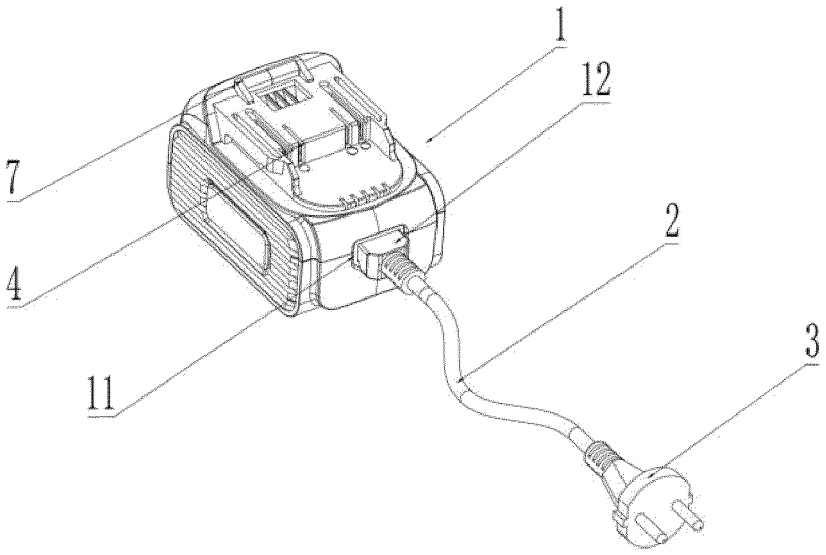

FIG. 2

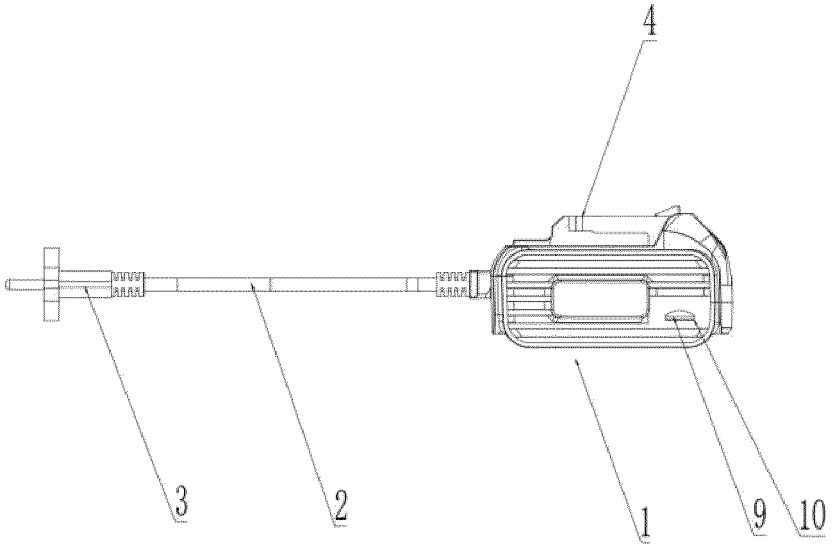

FIG. 3

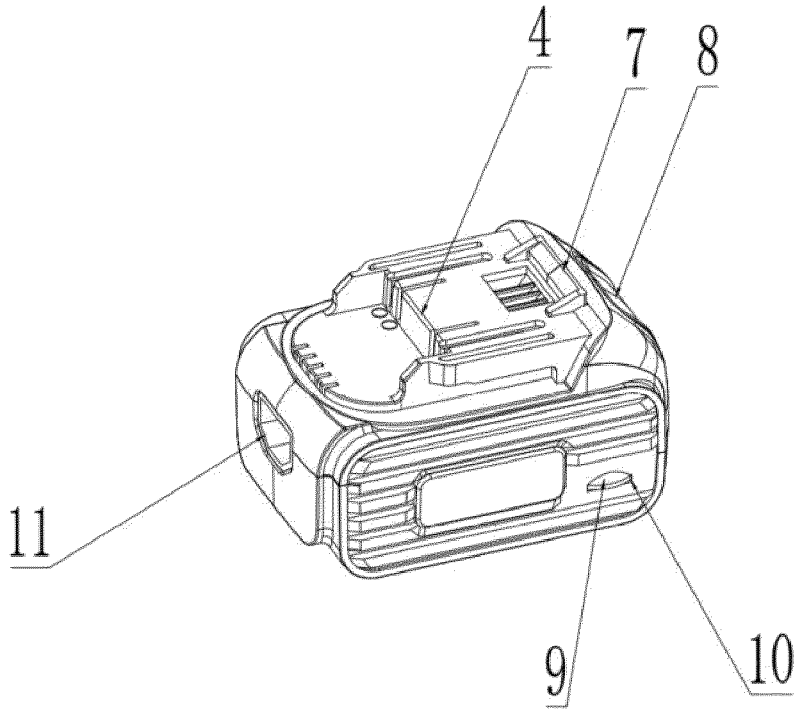

FIG. 4

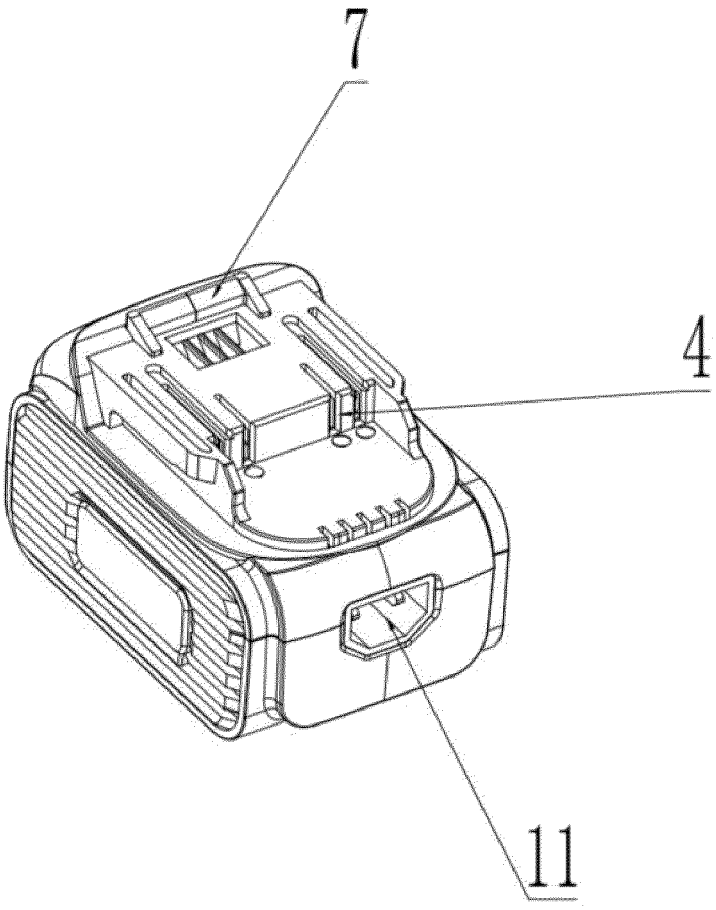

FIG. 5

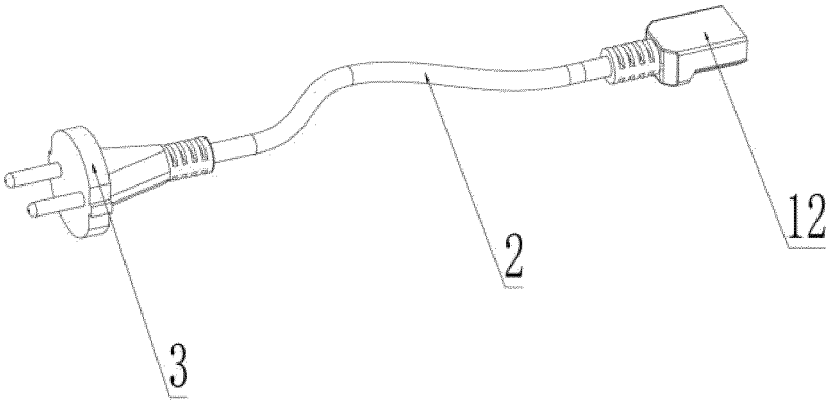

FIG. 6

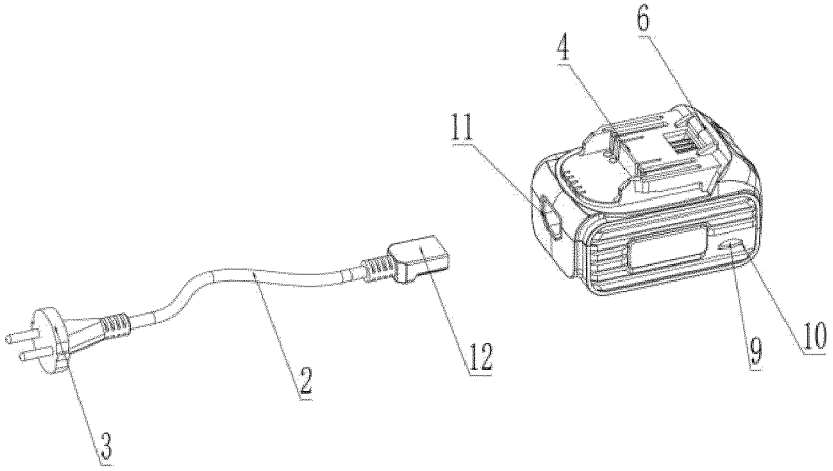

FIG. 7

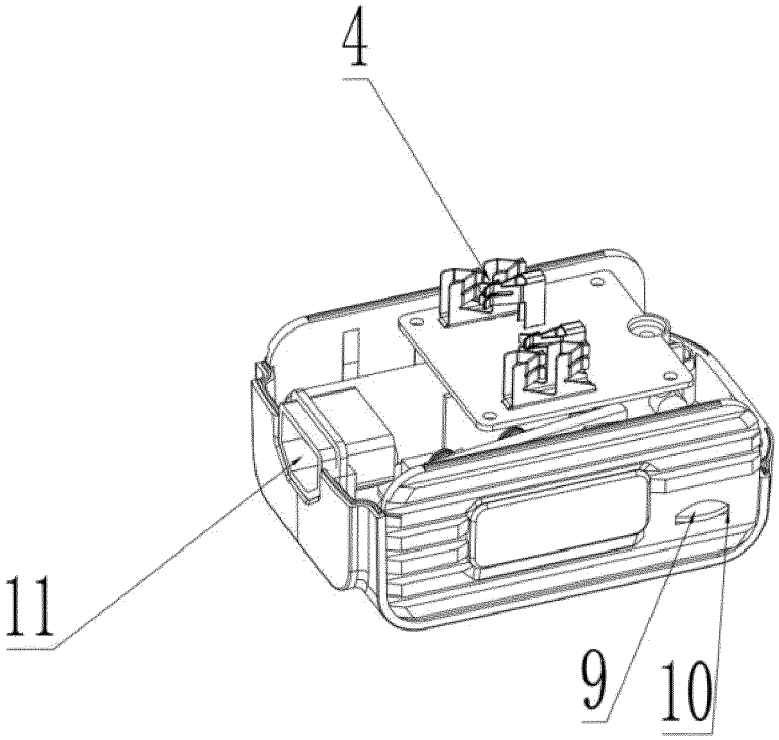

FIG. 8

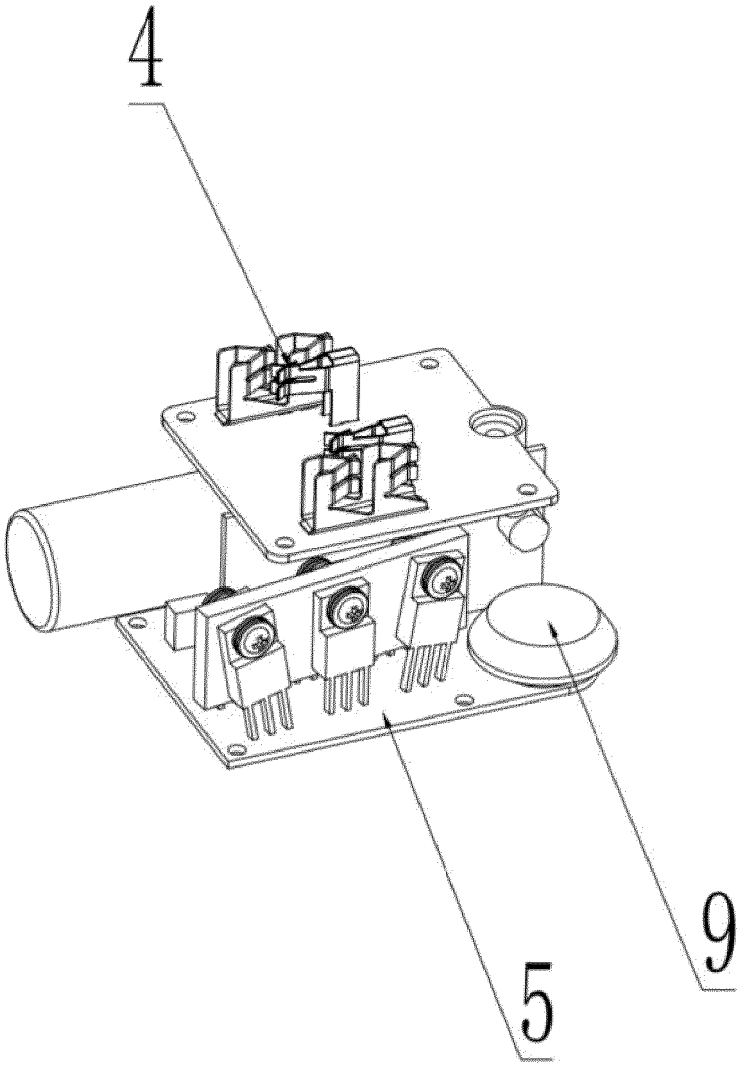

FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 24 19 5028

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	AU 2021 204 132 A1 (REEVES MONTGOMERY [AU]) 20 January 2022 (2022-01-20)	1,2	INV. B25F5/00
A	* paragraph [0001] - paragraph [0029] * * figures *	3,4	

X	DE 11 2018 004054 T5 (KOKI HOLDINGS CO LTD [JP]) 23 April 2020 (2020-04-23)	1,2	
A	* paragraph [0001] * * paragraph [0028] * * paragraph [0052] * * figures *	3,4	

X	US 2018/198299 A1 (MARTINEN WILLIAM [CA]) 12 July 2018 (2018-07-12)	1,2	
A	* paragraph [0001] - paragraph [0021] * * figures *	3,4	

TECHNICAL FIELDS SEARCHED (IPC)
B25F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 December 2024	van Woerden, N

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 19 5028

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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23-12-2024

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