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(54) **HAIR TRIMMER CAPABLE OF COOLING BLADE**

(57) This invention provides a hair trimmer capable of cooling the blade, comprising a body and blade that are thermally conductive to each other. The body contains a heat dissipation channel connected to the outside, and a fan blade is installed inside the body to expel heat from the heat dissipation channel to the outside. In this hair trimmer capable of cooling the blade, the blade transfers

heat to the body, and under the action of the fan blade, the heat from the body is expelled to the outside through convection and conduction via the heat dissipation channel. This effectively reduces the temperature of the blade, ensures trimming efficiency, reduces the risk of skin burns, enhances safety, and improves user experience.

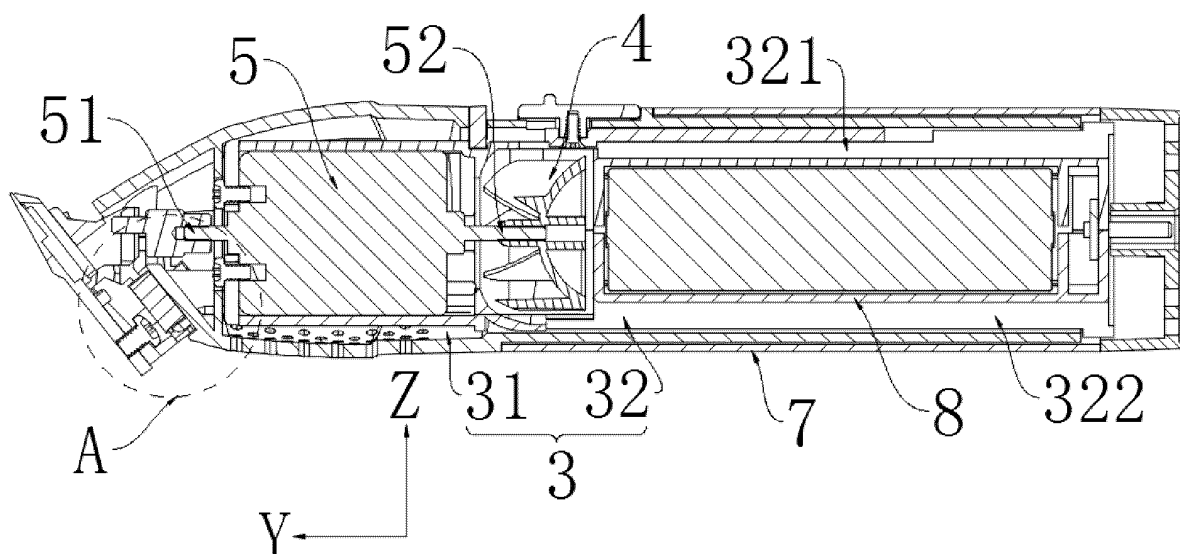


Fig. 2

Description

Technical Field

[0001] This invention relates to the field of hair trimmer technology, specifically to a hair trimmer capable of cooling the blade.

Background Technology

[0002] Hair trimmers are common personal care products used for trimming hair. Hair trimmers typically include a drive motor and a blade, with the drive motor powering the blade to achieve hair trimming. However, during hair trimming, the blade may sometimes become hot due to prolonged reciprocating motion. Since the blade typically comes into contact with sensitive and thin skin, the perception of blade heat can be quite sensitive, thus affecting user experience.

Content of the Invention

[0003] To solve at least one aspect of the above problem, this invention provides a hair trimmer capable of cooling the blade, comprising a body and a blade that are thermally conductive to each other, wherein the body contains a heat dissipation channel connected to the outside, and a fan blade is installed inside the body to expel heat from the heat dissipation channel to the outside.

[0004] Optionally, a dual-head motor is installed inside the body, the dual-head motor has a first output shaft and a second output shaft, the first output shaft is connected to the blade for power transmission, and the second output shaft is connected to the fan blade.

[0005] Optionally, it further includes a semiconductor cooling chip installed between the blade and the body, where the cooling surface of the semiconductor cooling chip is in contact with the blade.

[0006] Optionally, the fan blade is a centrifugal fan blade.

[0007] Optionally, the material of the body is metal.

[0008] Optionally, an insulation sleeve is fitted over the outer wall of the body.

[0009] Optionally, it further includes an inner lining shell for installing the dual-head motor and the fan blade, where the heat dissipation channel is formed between the body and the inner lining shell, the heat dissipation channel includes interconnected air intake channel and air outlet channel, and the air intake channel and the air outlet channel are located on the front and rear sides of the fan blade respectively.

[0010] Optionally, the air outlet channel includes an upper channel and a lower channel, both the upper channel and the lower channel are connected to the outside.

[0011] Optionally, the body is provided with multiple air inlets connected to the air intake channel.

[0012] Optionally, the air inlets are located on the front side of the fan blade.

[0013] Compared to the existing technology, in this hair trimmer capable of cooling the blade, the blade transfers heat to the body, and under the action of the fan blade, the heat from the body is expelled to the outside through convection and conduction via the heat dissipation channel. This effectively reduces the temperature of the blade, ensures trimming efficiency, reduces the risk of skin burns, enhances safety, and improves user experience.

Brief Description of Figures

[0014]

Figure 1 is a structural diagram of the hair trimmer capable of cooling the blade in this invention's embodiment;

Figure 2 is a sectional view of the hair trimmer capable of cooling the blade in this invention's embodiment;

Figure 3 is an enlarged view of part A in Figure 2.

Reference numerals:

[0015] 1 - body; 11 - air inlet; 2 - blade; 3 - heat dissipation channel; 31 - air intake channel; 32 - air outlet channel; 321 - upper channel; 322 - lower channel; 4 - fan blade; 5 - dual-head motor; 51 - first output shaft; 52 - second output shaft; 6 - semiconductor cooling chip; 7 - insulation sleeve; 8 - inner lining shell.

Detailed Description of Embodiments

[0016] To make the above objectives, features, and advantages of this invention more apparent and easier to understand, the specific embodiments of this invention will be described in detail with reference to the accompanying drawings.

[0017] In the description of this invention, it should be understood that terms such as "up" and "down" indicate orientations or positional relationships based on the normal use orientation or position of the product.

[0018] The terms "first" and "second" are used for descriptive purposes only and should not be understood as indicating or implying relative importance or implicitly indicating the number of technical features referred to. Thus, features defined as "first" and "second" may explicitly or implicitly include at least one such feature. The accompanying drawings of the embodiments in this invention have a coordinate system YZ, where the positive direction of the Y-axis represents the front, the negative direction of the Y-axis represents the rear, the positive direction of the Z-axis represents the top, and the negative direction of the Z-axis represents the bottom.

[0019] This invention's embodiments provide a hair

trimmer capable of cooling the blade. As shown in Figures 1 and 2, it includes a body 1 and a blade 2 that are thermally conductive to each other, wherein the body 1 contains a heat dissipation channel 3 connected to the outside, and a fan blade 4 is installed inside the body 1 to expel heat from the heat dissipation channel 3 to the outside.

[0020] The blade 2 is the heat-generating element, and the body 1 is made of a thermally conductive material with good heat dissipation properties. The blade 2 is thermally connected to the body 1, allowing heat from the blade 2 to be conducted to the body 1. The drive motor inside the body 1 is connected to the blade 2 via an eccentric wheel, enabling the blade 2 to move reciprocally. The fan blade 4 is preferably driven by a motor.

[0021] In this embodiment of the hair trimmer capable of cooling the blade, the blade 2 transfers heat to the body 1, and under the action of the fan blade 4, the heat from the body 1 is expelled to the outside through convection and conduction via the heat dissipation channel 3. This ultimately effectively reduces the temperature of the blade 2, ensures trimming efficiency, reduces the risk of skin burns, enhances safety, and improves user experience.

[0022] Optionally, as shown in Figures 1 and 2, a dual-head motor 5 is installed inside the body 1. The dual-head motor 5 has a first output shaft 51 and a second output shaft 52, where the first output shaft 51 is connected to the blade 2 for power transmission, and the second output shaft 52 is connected to the fan blade 4.

[0023] The dual-head motor 5 can simultaneously drive the blade 2 and the fan blade 4, greatly saving installation space. When the dual-head motor 5 is working, the first output shaft 51 can drive the blade 2 to move reciprocally, achieving hair trimming, while the second output shaft 52 can drive the fan blade 4 to rotate synchronously, generating airflow to remove heat while trimming hair, thus cooling the blade 2.

[0024] Optionally, as shown in Figures 1, 2, and 3, it also includes a semiconductor cooling chip 6 installed between the blade 2 and the body 1, where the cooling surface of the semiconductor cooling chip 6 is in contact with the blade 2.

[0025] The semiconductor cooling chip 6 is an electronic cooling technology that uses the thermoelectric effect of semiconductor materials to achieve cooling. When current passes through the junction of two different materials, they produce a temperature difference, with one side becoming cold the cooling surface and the other side becoming hot the heating surface. Semiconductor cooling chips 6 have advantages such as small size, light weight, no noise, high efficiency, energy-saving, and environmental friendliness. In this embodiment, the cooling surface of the semiconductor cooling chip 6 cools the blade 2, while the heat from the other side of the cooling chip (i.e., heating surface) is conducted to the body 1. Finally, under the action of the fan blade 4, the heat from the body 1 is expelled to the outside through convection

and conduction via the heat dissipation channel 3.

[0026] Optionally, as shown in Figures 1 and 2, the fan blade 4 is a centrifugal fan blade 4. A centrifugal fan blade 4 is a type of blade that can produce high-pressure, low-flow air. The centrifugal fan blade 4 uses centrifugal force to move air from the center outwards, then changes the direction of the air, directing it into the air outlet channel 32 of the heat dissipation channel 3. In this embodiment, the centrifugal fan blade 4 draws air to expel heat from the body 1.

[0027] Optionally, the material of the body 1 is metal, which can specifically be chosen as copper or aluminum. Copper is a commonly used heat-conductive material with excellent thermal conductivity and good mechanical strength. Aluminum is another commonly used heat-conductive material with high thermal conductivity and relatively light weight. In addition, the material of the body 1 can also be graphite, which is a non-metallic heat-conductive material with good thermal conductivity and corrosion resistance, often used in high-temperature furnace components for heat conduction.

[0028] Optionally, as shown in Figures 1 and 2, an insulation sleeve 7 is fitted over the outer wall of the body 1. The insulation sleeve 7 is generally made of heat-insulating rubber material, which, when fitted over the metal body 1, can prevent the body 1 from burning the user and provide a better grip feel. The insulation sleeve 7 is placed on the part of the body 1 where the hand grips.

[0029] Optionally, as shown in Figures 1 and 2, it also includes an inner lining shell 8 for installing the dual-head motor 5 and the fan blade 4. The heat dissipation channel 3 is formed between the body 1 and the inner lining shell 8. The heat dissipation channel 3 includes interconnected air intake channel 31 and air outlet channel 32, and the air intake channel 31 and the air outlet channel 32 are located on the front and rear sides of the fan blade 4 respectively.

[0030] The dual-head motor 5 drives the fan blade 4 to rotate, generating wind power that draws in outside air through the air intake channel 31. After carrying away the heat, the air is expelled through the air outlet channel 32, thus cooling the blade 2 and improving comfort and safety during use. The inner lining shell 8 also provides heat insulation, protecting the motor and other key components, thereby extending the product's lifespan.

[0031] Optionally, as shown in Figure 1 and Figure 2, the air outlet channel 32 includes an upper channel 321 and a lower channel 322, both of which are connected to the outside. When the fan blade 4 starts working, outside air enters the air intake channel 31 and, under the action of the fan blade 4, flows towards the upper channel 321 and lower channel 322 respectively, then exits to the outside. This results in fast air circulation and high heat exchange efficiency.

[0032] Optionally, as shown in Figure 1 and Figure 2, the body 1 has multiple air inlets 11 connected to the air intake channel 31. These multiple air inlets 11 are spaced out on the body 1, ensuring sufficient air intake without

affecting the overall appearance.

[0033] Optionally, as shown in Figure 1 and Figure 2, the air inlets 11 are located on the front side of the fan blade 4. With the air inlets 11 on the front side of the fan blade 4 and the air outlet at the tail of the body 1, the airflow enters from the front end of the body 1 and exits towards the tail end, reducing mutual interference between the airflow of the air inlets 11 and the air outlet, thus ensuring effective heat exchange.

[0034] Although the invention has been described as above, the scope of protection of this invention is not limited to this. Those skilled in the art can make various changes and modifications without departing from the spirit and scope of this invention, and these changes and modifications will all fall within the scope of protection of this invention.

Claims

1. A hair trimmer capable of cooling blade, **characterized by** comprising a body (1) and a blade (2) that are thermally conductive to each other, wherein the body (1) contains a heat dissipation channel (3) connected to the outside, and a fan blade (4) is installed inside the body (1) to expel heat from the heat dissipation channel (3) to the outside.
2. The hair trimmer capable of cooling the blade according to claim 1, **characterized in that** a dual-head motor (5) is installed inside the body (1), the dual-head motor (5) has a first output shaft (51) and a second output shaft (52), the first output shaft (51) is connected to the blade (2) for power transmission, and the second output shaft (52) is connected to the fan blade (4).
3. The hair trimmer capable of cooling blade according to claim 1, **characterized by** further comprising a semiconductor cooling chip (6) installed between the blade (2) and the body (1), wherein the cooling surface of the semiconductor cooling chip (6) is in contact with the blade (2).
4. The hair trimmer capable of cooling blade according to claim 1, **characterized in that** the fan blade (4) is a centrifugal fan blade (4).
5. The hair trimmer capable of cooling blade according to claim 1, **characterized in that** the material of the body (1) is metal.
6. The hair trimmer capable of cooling blade according to claim 1, **characterized in that** an insulation sleeve (7) is fitted over the outer wall of the body (1).
7. The hair trimmer capable of cooling blade according to claim 2, **characterized by** further comprising an

inner lining shell (8) for installing the dual-head motor (5) and the fan blade (4), wherein the heat dissipation channel (3) is formed between the body (1) and the inner lining shell (8), the heat dissipation channel (3) includes interconnected air intake channel (31) and air outlet channel (32), and the air intake channel (31) and the air outlet channel (32) are located on the front and rear sides of the fan blade (4) respectively.

8. The hair trimmer capable of cooling blade according to claim 7, **characterized in that** the air outlet channel (32) includes an upper channel (321) and a lower channel (322), both the upper channel (321) and the lower channel (322) are connected to the outside.
9. The hair trimmer capable of cooling blade according to claim 7, **characterized in that** the body (1) is provided with multiple air inlets (11) connected to the air intake channel (31).
10. The hair trimmer capable of cooling blade according to claim 9, **characterized in that** the air inlets (11) are located on the front side of the fan blade (4).

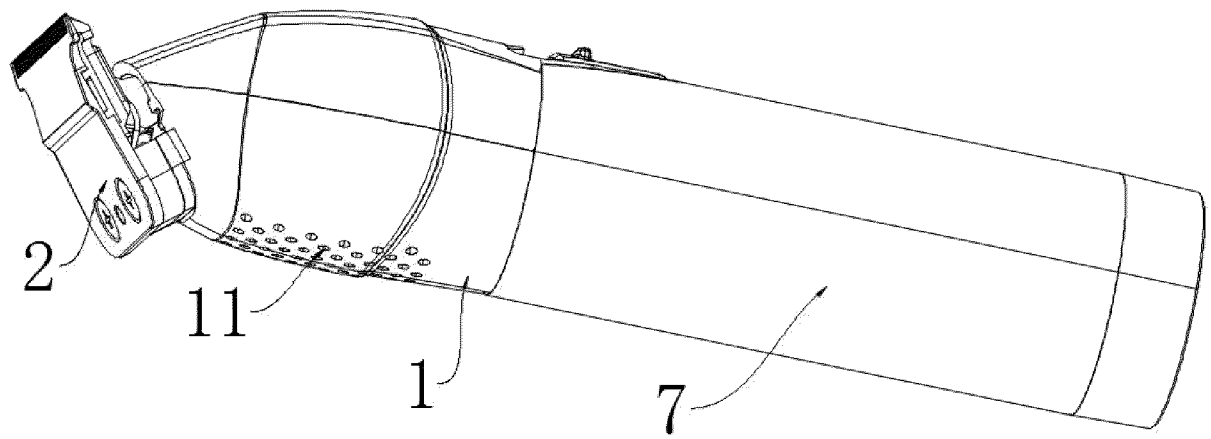


Fig. 1

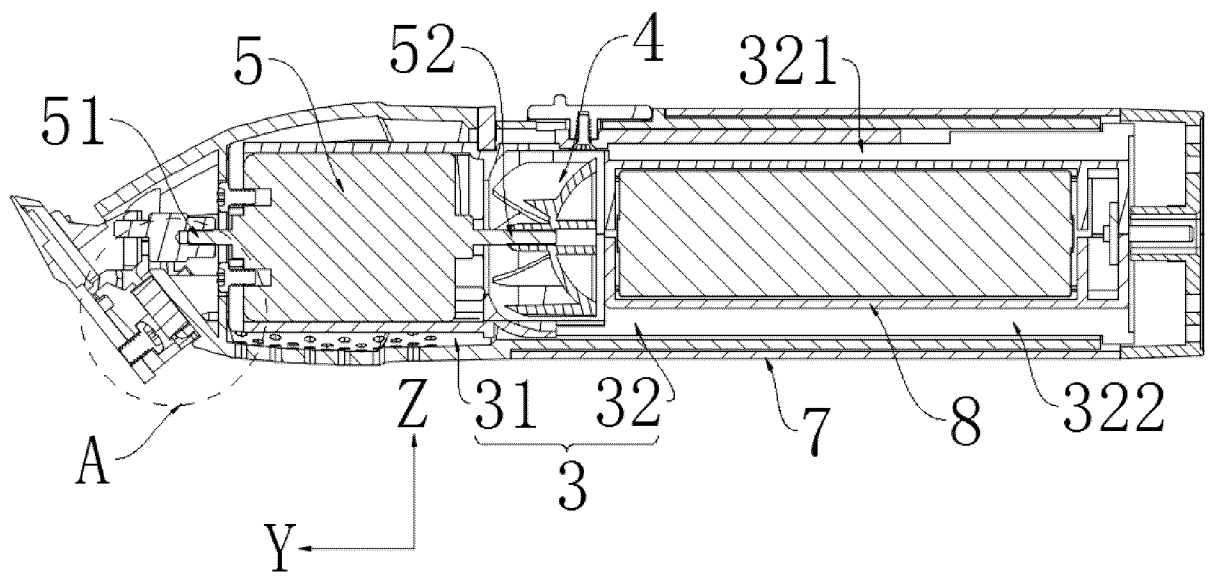


Fig. 2

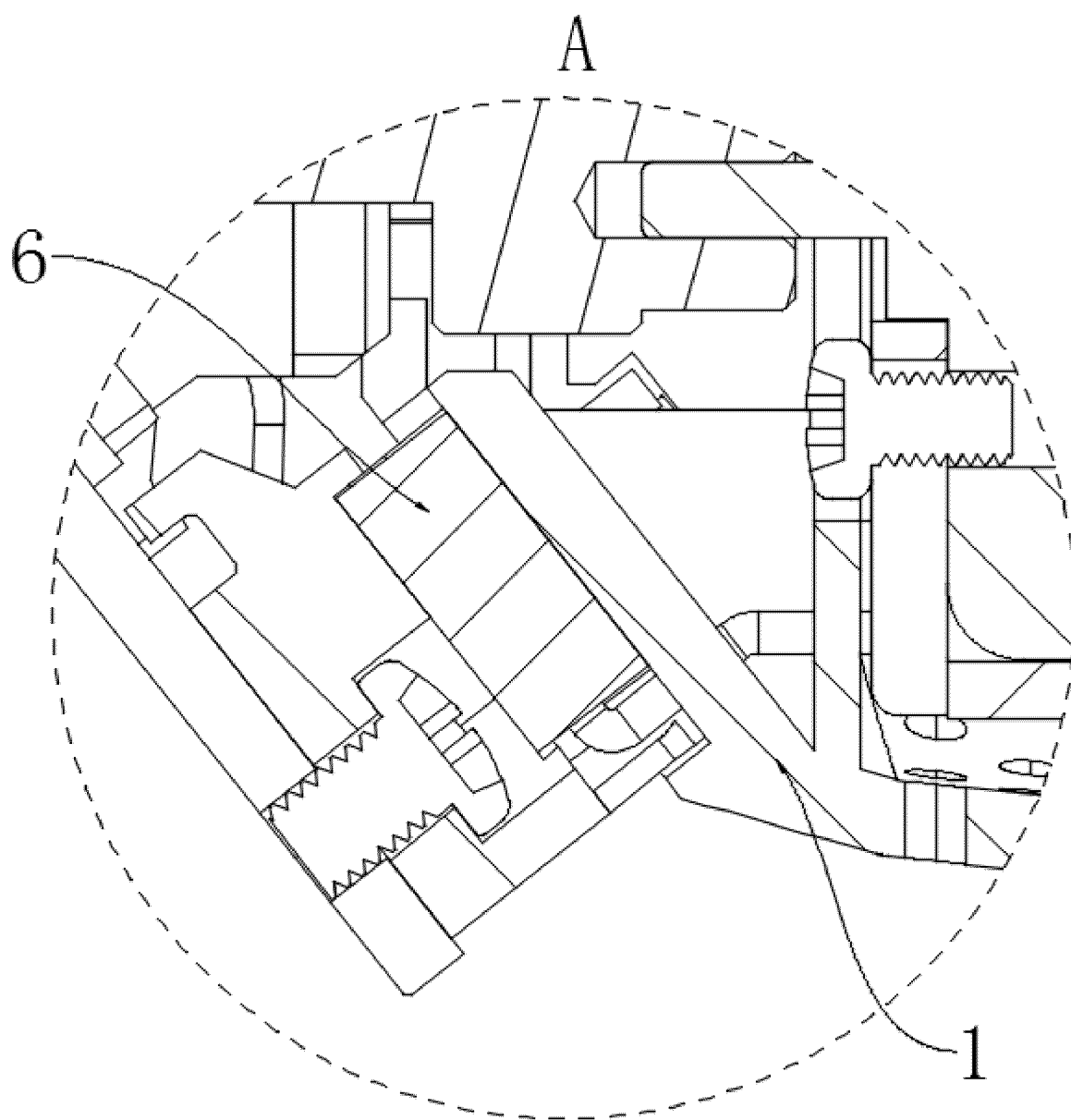


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/132844

A. CLASSIFICATION OF SUBJECT MATTER

B26B19/04(2006.01)i; B26B19/38(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC:B26B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNTXT, ENTXT, VEN, CNKI: 剃须刀, 电推剪, 理发剪, 毛发修剪, 风扇, 风叶, 扇叶, 叶片, 制冷, 冷却, 散热, 通道, 风道, shaver, clipper, fan, blade, refrigeration, cooling, heat, dissipation, passage, duct

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	US 2015367521 A1 (SPECTRUM BRANDS, INC.) 24 December 2015 (2015-12-24) description, specific embodiments, and figures 1-11	1, 3-6

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"D" document cited by the applicant in the international application	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 12 January 2024	Date of mailing of the international search report 22 January 2024
Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088	Authorized officer Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
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Information on patent family members

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