



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
28.12.2022 Bulletin 2022/52

(51) International Patent Classification (IPC):
H01R 13/639 ^(2006.01)

(21) Application number: **21764853.4**

(52) Cooperative Patent Classification (CPC):
H01R 13/6205; H01R 13/22; H01R 13/7037;
H01R 2103/00

(22) Date of filing: **03.03.2021**

(86) International application number:
PCT/CN2021/078856

(87) International publication number:
WO 2021/175246 (10.09.2021 Gazette 2021/36)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Qingdao Wenji Medical Technology Co., Ltd.**
Qingdao, Shandong 266000 (CN)

(72) Inventor: **LI, Yong**
Qingdao, Shandong 266000 (CN)

(74) Representative: **Sun, Yiming**
HUASUN Patent- und Rechtsanwälte
Friedrichstraße 33
80801 München (DE)

(30) Priority: **06.03.2020 CN 202010155472**

(54) **SOCKET, PLUG AND POWER STRIP**

(57) Disclosed in the present invention are a socket, a plug and a power strip. The socket comprises an earth line contact, a live line contact and a neutral line contact, wherein a live line metal elastic sheet and a neutral line metal elastic sheet are arranged in a socket accommodating cavity, and the live line metal elastic sheet and the neutral line metal elastic sheet are respectively connected to or disconnected from the live line contact and the neutral line contact under the action of a magnetic force. The plug comprises a strong magnetic plate on a plug body, and the strong magnetic plate is provided with an earth line matching column, a live line matching column and a neutral line matching column which match the earth line contact, the live line contact and the neutral line contact. The power strip comprises a plurality of sockets, and the plurality of sockets are sequentially arranged in parallel at intervals. The present invention overcomes the defects of a traditional jack, is waterproof, has no electricity when no plug is inserted, is connected by means of a magnetic single contact, and has a simple and safe design structure.

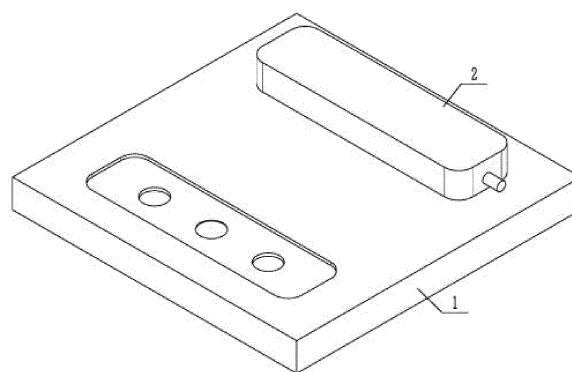


FIG.1

Description

FIELD OF THE INVENTION

[0001] The invention relates to the technical field of electrical equipment, in particular to a socket, a plug conformed to the socket and a power strip provided with a plurality of sockets.

BACKGROUND OF THE INVENTION

[0002] The socket refers to a socket into which one or more circuit connection wires can be inserted, and various connection wires can be inserted through the socket so as to be conveniently communicated with other circuits. The connection and disconnection between the circuit and the copper part inside the socket are realized, hence the connection and disconnection of the partial circuit are finally realized.

[0003] The defects of the existing socket are: electric shock accidents can occur if children insert metal into the jack; short circuit even explosive combustion in case of the socket is covered by combustibles, stuck by dust, or water intrusion, etc.; the internal damage of self-releasing of the socket related to frequent plug in and out.

SUMMARY OF THE INVENTION

[0004] A main object of the present invention is to provide a socket, a plug and a power strip, wherein the magnetic adsorption, instead of jack, is used to make the plug conformed to the socket and power strip, solving some defects of the existing ones.

[0005] Solution to problem of the present invention relating to the technical problems is:

The socket comprises the socket body, wherein the socket body is provided with at least one plug position, wherein the plug position is provided with an earth line contact, a live line contact and a neutral line contact; and a socket accommodating cavity that is provided with a live line metal elastic sheet and a neutral line metal elastic sheet, and wherein the above metal elastic sheets are connected to or disconnected from the earth line contact, live line contact and neutral line contact, respectively, under the magnetic force.

[0006] Furthermore, a live line side contact plate is equipped on the live line contact side, and a neutral line side contact plate on the neutral line contact side, wherein the live line and neutral line metal elastic sheet are respectively connected to or disconnected from the live line side contact plate and the neutral line side contact plate under the action of a magnetic force.

[0007] Furthermore, the heights of the earth line contact, live line contact and neutral line contact are lower than that of the plug position.

[0008] Furthermore, wherein a live line contact and a neutral line contact are provided respectively on both sides of the earth line contact.

[0009] Furthermore, wherein the height of the earth line contact is higher than that of live line contact and neutral line contact.

[0010] Furthermore, wherein no insulating ring is available around the earth line contact, live line contact and neutral line contact.

[0011] Furthermore, the plug insertion depth is between 1mm-10mm, preferably 2-5mm.

[0012] Furthermore, the live line metal elastic sheet comprises a horizontal clamping plate, of which the left and right sides are respectively provided with a left and a right chute board, wherein the chute boards are connected with one horizontal clamping plate on each side, wherein the horizontal clamping plates on the left and right side are directly above the live line contact in position.

[0013] Furthermore, wherein the left and right chute boards are provided with regulation orifices, wherein the regulation orifices have jack bolts are in threaded connection with the screw holes inside the socket body.

[0014] A plug conformed to the socket, wherein, the plug comprises the plug body with the install cavity arranged in it, a strong magnetic plate is equipped on the bottom of the install cavity, wherein it is provided with an earth line matching column, a live line matching column and a neutral line matching column, matched with an earth line contact, a live line contact and a neutral line contact, respectively.

[0015] Furthermore, a first sliding hole, a second hole and a third sliding hole are arranged on the strong magnetic plate, and wherein sliding fit in the first sliding hole is matched with the live line matching column; the second hole is fixed with the earth line matching column; the sliding fit in the third sliding hole is matched with the neutral line matching column, and wherein a first fixed column and a second fixed column are arranged in the installation cavity, among which the first fixed column is connected with the live line matching column through the left metal elastic plate, and the second fixed column is connected with the neutral line matching column through the right metal elastic plate.

[0016] Furthermore, the length of the earth line matching column protruding from the metal elastic sheet is less than the length of the neutral line matching column and the live line matching column.

[0017] Furthermore, the plug has a spacing adjustor, wherein, the spacing comprises a cannula that is connected to the strong magnetic plate, and wherein the cannula is provided with a jack, and the inner wall of the jack is provided with several ring grooves, and wherein the plug body is provided with an inserting rod, which is connected to the inner wall of the installation cavity, wherein its end is provided with a ring chuck, which is conformed to the ring groove.

[0018] A power strip, wherein it comprises a plurality of sockets; and wherein a plurality of the socket bodies are arranged at intervals in turn, and a plurality of the socket bodies are arranged in parallel.

[0019] Advantages effects of the invention are: the present invention overcomes the defects of a traditional jack, is waterproof, has no electricity when no plug is inserted, is connected by means of a magnetic single contact even when power contacts are connected using magnet adsorbing without forming loop, wherein it has a simple and safe design structure, which can realize the flat and miniaturized design of power strip, making it more elegant in appearance and cheaper in price.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

FIG. 1 shows a three-dimensional illustration of when the plug is inserted on the socket.

FIG. 2 is a bottom view of the present invention.

FIG. 3 shows a three-dimensional illustration of the socket.

FIG. 4 is a cut-away view of the socket.

FIG. 5 shows a three-dimensional illustration of the plug.

FIG. 6 is a cut-away view of the plug.

FIG. 7 is a partially cut-away view of the socket.

FIG. 8 is a cut-away view of the second example of the plug.

FIG. 9 is the drawing of partial enlargement of part A in FIG. 8.

FIG. 10 is the structure diagram of the power strip.

DETAILED DESCRIPTION

[0021] The disclosure may be more clearly and completely understood in consideration of the following detailed description of the solution to problem in connection with the accompanying drawings, it is to be understood that the disclosed embodiments are partially, not all. All embodiments based on the invention and all other embodiments obtained by one of ordinary skill in the art without creative work belong to the protection scope of the invention.

[0022] Certain terminology may be used in the following description for convenience in reference only and should not be interpreted as limiting, for example, the terms "central" "upward" "downward" "leftward" "rightward" "vertical" "horizontal" "inside" "outside", etc., will refer to directions in the drawings, rather than indicating or implying that the embodiment being described and designated parts thereof must in a specific orienta-

tion, or being constructed and operated in a specific orientation thereof. Additionally, the terms "first" "second" "third" as used herein denoted for description only, and should not be interpreted as an indication or implication of relative importance.

[0023] It should be noted that, in the description disclosed herein, except otherwise specified and defined, the terms "installation", "connected" and "connection" should be interpreted in a broad sense, for example, it can be fixed connection, detachable connection or integrated connection; it can be mechanical connection or electrical connection; it can be directly connected, or indirectly connected through inter medium, and it can be the connection between two components. For one of ordinary skill in the art, the specific meaning of the above terms in the invention can be understood according to the specific situation.

[0024] As shown in FIGS. 1-9, a socket 1 comprises the socket body 11, wherein the socket body is provided with at least one plug position, whereas in this embodiment, the socket body is provided with two plug positions, and the socket body with multiple plug positions can also be produced according to the actual demand.

[0025] Specifically in this embodiment, the socket body 11 is provided with a first positioning slot 12 and two 13, wherein the plug 2 can be inserted into the first and/or second positioning slot, therefore the socket has two insertion positions.

[0026] The shape of the plug is confirmed to that of the first positioning slot and second positioning slot.

[0027] Three power contacts are respectively set in the first positioning slot and second positioning slot for conforming to the plug, wherein the power contacts are earth line contact, live line contact and neutral line contact, respectively, and wherein the two sides of the earth line contact are respectively set with live line contact and neutral line contact, and the height of the earth line contact is higher than the live line contact and neutral line contact. In this case, the contact design is adopted instead of the jack design, leaving the upper side of the socket a closed surface, which has a very good waterproof effect, and also avoids electric shock accidents caused by children inserting metal into the jack. In this case, the earth line is used to separate the live line from the neutral line., therefore, in case of electric shock, the earth line can also be used to conduct electricity to avoid safety accidents.

[0028] Furthermore, the three power contacts are lower than the height of the first and second positioning slots, which is in sinking style. The insulating ring 18 is arranged around the power contact as the contact protection. If the power contact is flat, or even higher than the socket body, children are prone to danger by holding a magnet to absorb the contact.

[0029] Refinement of implementation plan, wherein, the depth of the first and second positioning slots is between 1mm-10mm, preferably 2-5mm.

[0030] Specifically in this embodiment, the middle of

the first positioning slot 12 is provided with a first earth line contact 122, and wherein both sides of the first earth line contact are respectively provided with the first live line contact 121 and the first neutral line contact 123. It should be noted that the depth of the first earth line contact is lower than that of the first live line contact and the first neutral line contact. For example, when the depth of first earth line contact is 1mm, the depth of the first live line contact and the first neutral line contact can be 2mm-5mm. Similarly, the middle of the second positioning slot is provided with a second earth line contact 132, and wherein both sides of the second earth line contact are respectively provided with the second live line contact 131 and the second neutral line contact 133.

[0031] The socket body is internally provided with at least two fixed blocks, i.e., the first fixed block 141 and the second fixed block 143. The first fixed block and the second fixed block are both connected with the metal elastic sheet. Wherein, the two metal elastic sheets correspond to the live line contact and neutral line contact, respectively. When the plug is inserted into the first or second positioning slot, the metal spring will be connected to the live line contact and the neutral line contact through magnetizing by the magnet in the plug and the circuit is on thereby.

[0032] Specifically in this embodiment, see FIG. 2, the socket body is internally provided with the first fixed block 141 and the second fixed block 143, wherein, the first fixed block is connected with a first metal spring 151. In coordination with it, one side of the first live line contact 121 is connected with a first metal connecting plate 161, and one side of the second live line contact 131 is connected with a second metal connecting plate 163, and wherein both ends of the first metal spring are directly above the first metal connecting plate and the second metal connecting plate. The second fixed block is connected with a second metal spring plate 153. In coordination with it, a third metal connecting plate 162 is connected at one side of the first neutral line contact 123, and a fourth metal connecting plate 164 is connected at one side of the second neutral line contact 133, wherein both ends of the second metal spring plate are directly above the third metal connecting plate and the fourth metal connecting plate. The first earth line contact 122 and the second earth line contact are connected through the third metal connecting plate 152. The live line 171 of the power supply is connected with the first fixed block 141 through the wire, the neutral line 173 of the power supply is connected with the second fixed block through the wire, and the earth line 172 of the power supply can be connected with the third metal connecting plate through the wire.

[0033] The first metal connecting plate, the second metal connecting plate, the third metal connecting plate and the fourth metal connecting plate are set up, instead of connecting the metal spring contact directly with the power contact (live line contact and neutral line contact). The purpose is to prevent children from safety accidents

caused by accidental adsorption of metal elastic sheet caused by sticking magnets to live line contact and neutral line contact, therefore, in this case, single point adsorption is adopted, wherein the probability of simultaneously triggering the live line and neutral line is small, but it cannot be ignored.

[0034] Furthermore, the third metal connecting plate contacts the socket body through the central fixed block 142.

[0035] Specifically in this embodiment, the first metal connecting plate is same in construction with the second metal connecting plate, see FIG. 4. Wherein, the first metal connecting plate 151 comprises a horizontal clamping plate 1511, of which both sides are respectively provided with a left chute board 1512 and a right chute board 1514, and wherein the left chute board is connected with the left horizontal clamping plate 1513, which is set directly above the first live line contact; the right chute board is connected with the right horizontal clamping plate 1515, which is set directly above the second live line contact.

[0036] Refinement of implementation plan, wherein the left chute board and right chute board are provided with regulation orifices 19, in which a jack bolt 192 is installed, wherein the jack bolt is in threaded connection with the screw holes 191 inside the socket body, thereby adjusting the relative height of the left horizontal clamping plate and the right horizontal clamping plate to the power contact.

[0037] The disclosure provides a plug 2 conformed to the socket, as shown in FIGS 5 to 9. Wherein, the plug comprises a plug body 21, which is hollow inside, a strong magnetic plate 26 is installed on the plug body, and wherein, a first sliding hole 271, a second hole 272 and a third sliding hole 273 are set on the strong magnetic plate. Wherein, the sliding fit in the first sliding hole is matched with the live line matching column 22; the second hole is fixed with the earth line matching column 23; the sliding fit in the third sliding hole is matched with the neutral line matching column 24, and wherein a first fixed column 274 and a second fixed column 276 are arranged in the plug body, among which the first fixed column is connected with the live line matching column through the left metal elastic plate 275, and the second fixed column is connected with the neutral line matching column through the right metal elastic plate 277. The first fixed column is connected with the first wire 281, the second fixed column is connected with the second wire 283, and the earth line matching column is connected with the third wire 282. The first wire, the second wire and the third wire can be connected with the power cord of the electrical appliance by passing through the perforation 25 on one side of plug.

[0038] Furthermore, the length of the earth line matching column protruding from the metal elastic sheet is less than the length of the neutral line matching column and the live line matching column.

[0039] Furthermore, the length of the neutral line

matching column and live line matching column protruding from the metal elastic sheet is greater than that of the first live line contact and first neutral line contact. Since the power contact of the socket is fixed, the elastic movement of neutral line matching column and live line matching column can lead to better conjunction of the plug with the socket under the action of strong magnetism.

[0040] Furthermore, a spacing adjuster is arranged between the strong magnetic plate and the plug body, see FIGS. 8-9. Wherein, the spacing adjuster comprises a cannula 291, and wherein the cannula is provided with a jack 295, and the inner wall of the jack is provided with several ring grooves 292, in coordination with it, the plug body is provided with an inserting rod 293, wherein its end is provided with a ring chuck 294, which is matched with the ring groove. The relative distance between the strong magnetic plate and the socket can be changed by pressing the strong magnetic plate to place the ring chuck in different ring grooves, thereby changing the absorbed magnetic force.

[0041] Working mode: Suppose the plug is inserted into the first positioning slot 12 of the socket, meanwhile, the strong magnetic plate is adsorbed in the first positioning slot. At this time, while the earth line matching column is inserted into the first earth line contact, the neutral line matching column and live line matching column are in good contact with the first neutral line contact and the first live line contact under the action of the metal elastic plate. Due to the existence of strong magnetic plate, the end of the first metal connecting plate and the second metal connecting plate can be adsorbed to contact with the first neutral line contact and first live line contact, respectively, and the circuit is on thereby.

[0042] FIG. 10 is the structure diagram of the power strip provided by the embodiment of the invention, as shown in FIG. 10, on the basis of the above embodiments, wherein, the embodiment of the invention also provides a power strip, which comprises a plurality of sockets 1; wherein a plurality of sockets are arranged at intervals in turn, and arranged in parallel.

[0043] The arrangement of a plurality of sockets 1 can enable the power strip to hold multiple plugs simultaneously, or connect multiple electrical appliances, therefore expanding the applicability and enhance the functionality.

[0044] The technical features in addition to described herein are by way of known ones for those skilled in the art.

Claims

1. The socket comprises the socket body, wherein the socket body is provided with at least one plug position, wherein the plug position is provided with an earth line contact, a live line contact and a neutral line contact; and a socket accommodating cavity that is provided with a live line metal elastic sheet and a

neutral line metal elastic sheet, and wherein the above metal elastic sheets are connected to or disconnected from the earth line contact, live line contact and neutral line contact, respectively, under the magnetic force.

The heights of the earth line contact, live line contact and neutral line contact are lower than that of the plug position, and/or, wherein a live line contact and a neutral line contact are provided respectively on both sides of the earth line contact, and/or, wherein the height of the earth line contact is higher than that of live line contact and neutral line contact, and/or, wherein no insulating ring is available around the earth line contact, live line contact and neutral line contact.

2. The socket as claimed in claim 1, wherein, a live line side contact plate is equipped on the live line contact side, and a neutral line side contact plate on the neutral line contact side, wherein the live line and neutral line metal elastic sheet are respectively connected to or disconnected from the live line side contact plate and the neutral line side contact plate under the action of a magnetic force.

3. The socket as claimed in claim 1, wherein, the live line metal elastic sheet comprises a horizontal clamping plate, of which the left and right sides are respectively provided with a left and a right chute board, wherein the chute boards are connected with one horizontal clamping plate on each side, wherein the horizontal clamping plates on the left and right side are directly above the live line contact in position.

4. The socket as claimed in claim 3, wherein, the left and right chute boards are provided with regulation orifices, wherein the regulation orifices have jack bolts are in threaded connection with the screw holes inside the socket body.

5. The plug conformed to the socket as claimed in any one of claims 1-4, wherein, the plug comprises the plug body with the install cavity arranged in it, a strong magnetic plate is equipped on the bottom of the install cavity, wherein it is provided with an earth line matching column, a live line matching column and a neutral line matching column, matched with an earth line contact, a live line contact and a neutral line contact, respectively.

6. The plug as claimed in claim 5, wherein, a first sliding hole, a second hole and a third sliding hole are arranged on the strong magnetic plate, and wherein sliding fit in the first sliding hole is matched with the

live line matching column; the second hole is fixed with the earth line matching column; the sliding fit in the third sliding hole is matched with the neutral line matching column, and wherein a first fixed column and a second fixed column are arranged in the installation cavity, among which the first fixed column is connected with the live line matching column through the left metal elastic plate, and the second fixed column is connected with the neutral line matching column through the right metal elastic plate.

7. The plug as claimed in claim 5, wherein, the length of the earth line matching column protruding from the metal elastic sheet is less than the length of the neutral line matching column and the live line matching column.
8. The plug as claimed in claim 5, wherein, the plug has a spacing adjustor, wherein, the spacing adjustor comprises a cannula that is connected to the strong magnetic plate, and wherein the cannula is provided with a jack, and the inner wall of the jack is provided with several ring grooves, and wherein the plug body is provided with an inserting rod, which is connected to the inner wall of the installation cavity, wherein its end is provided with a ring chuck, which is conformed to the ring groove.
9. A power strip, wherein it comprises a plurality of sockets as claimed in any one of claims 1-5; wherein a plurality of socket bodies are arranged at intervals in turn, and a plurality of the socket bodies are arranged in parallel.

35

40

45

50

55

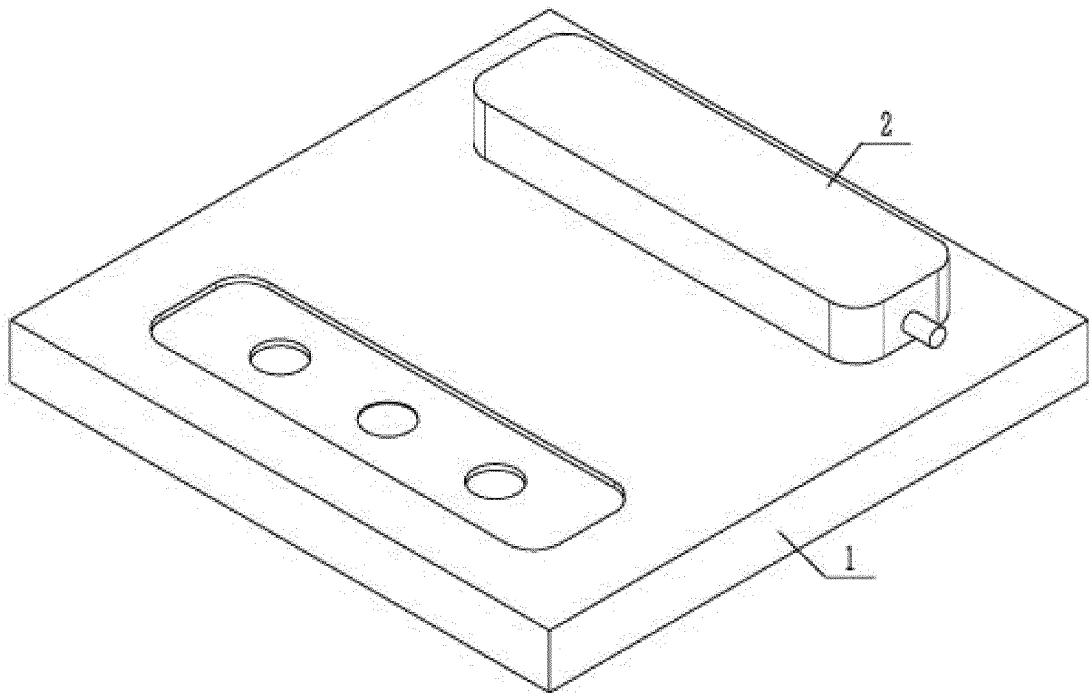


FIG.1

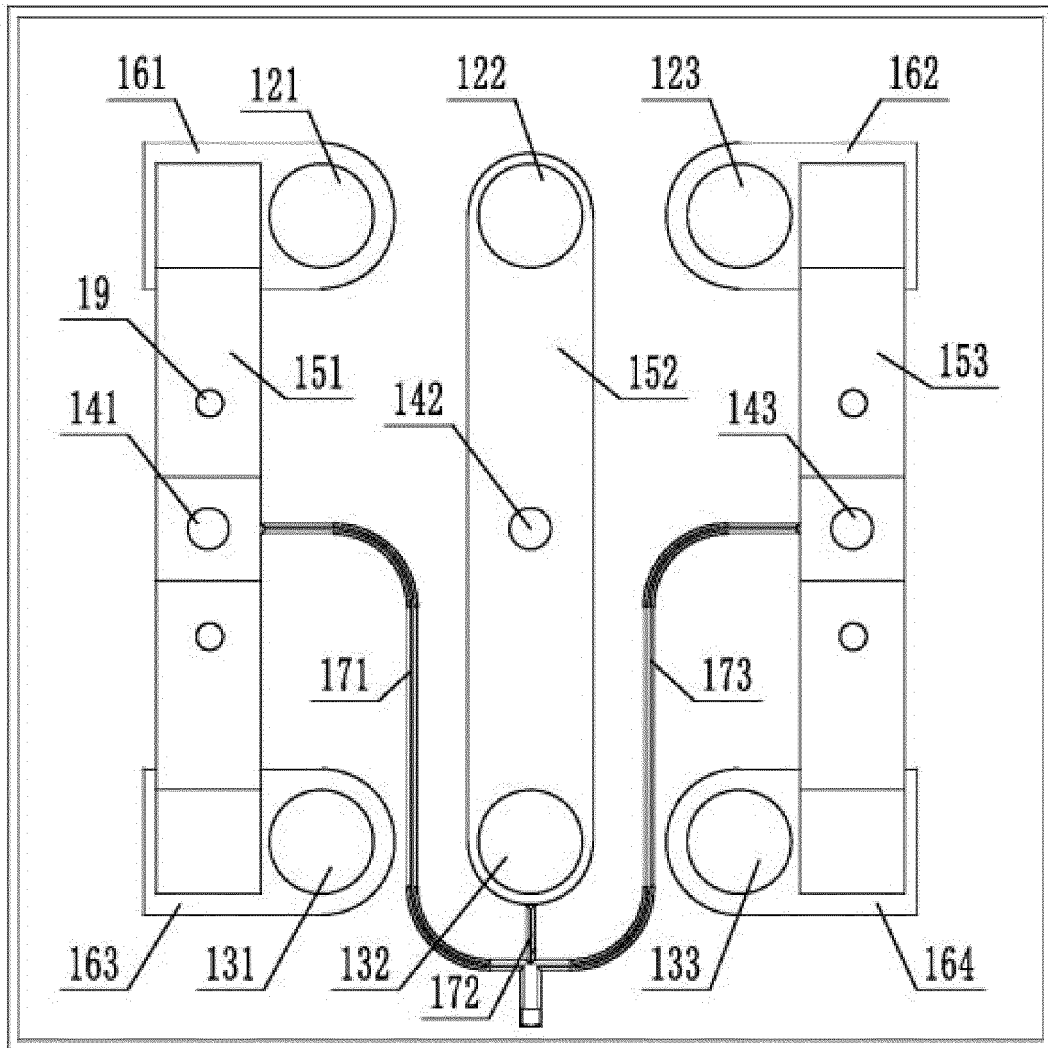


FIG.2

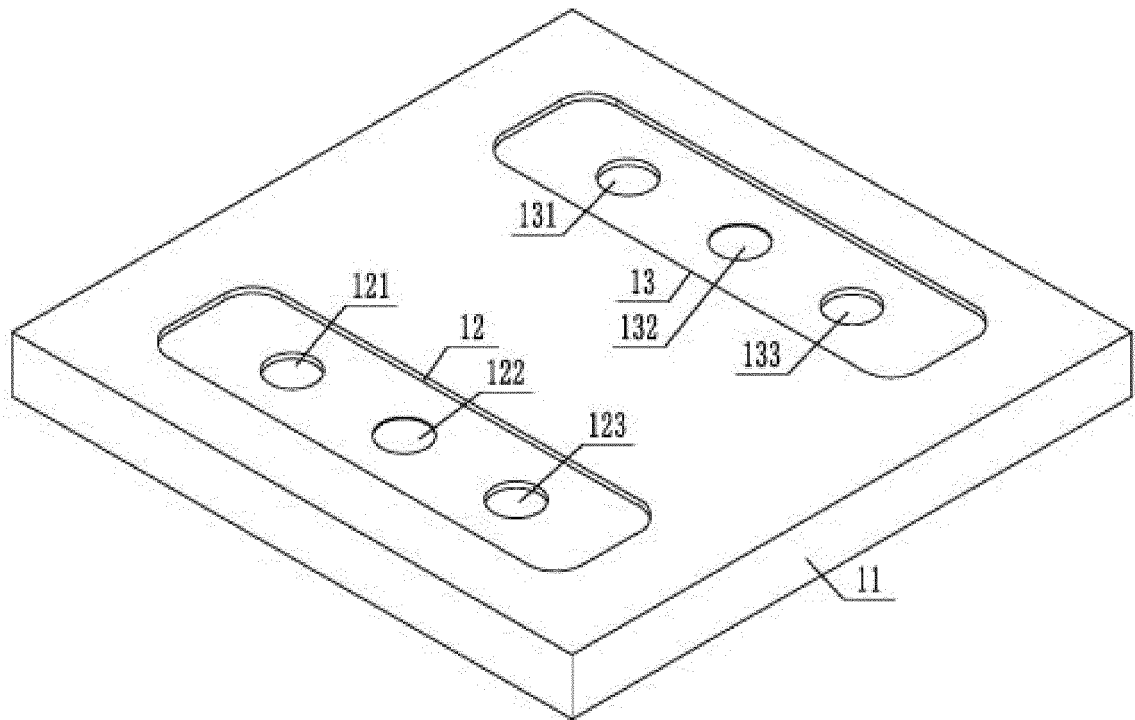


FIG. 3

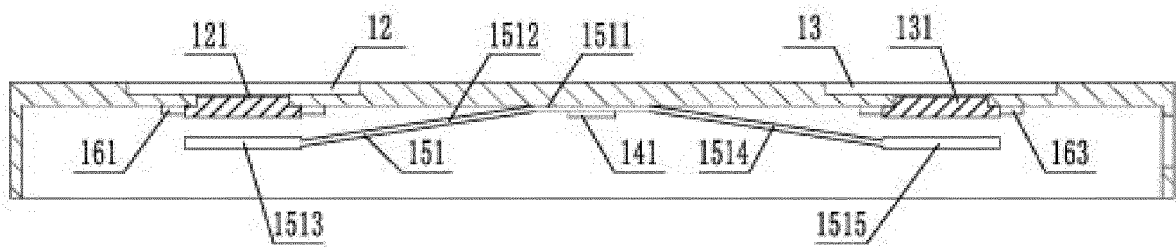


FIG. 4

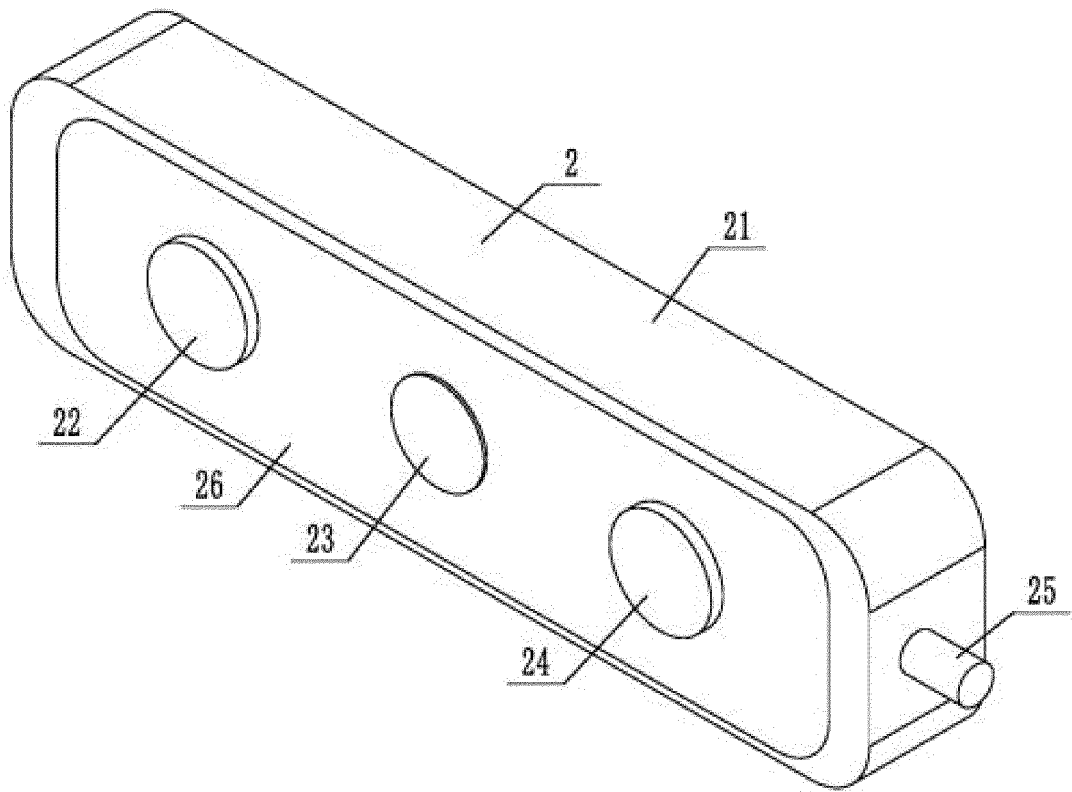


FIG. 5

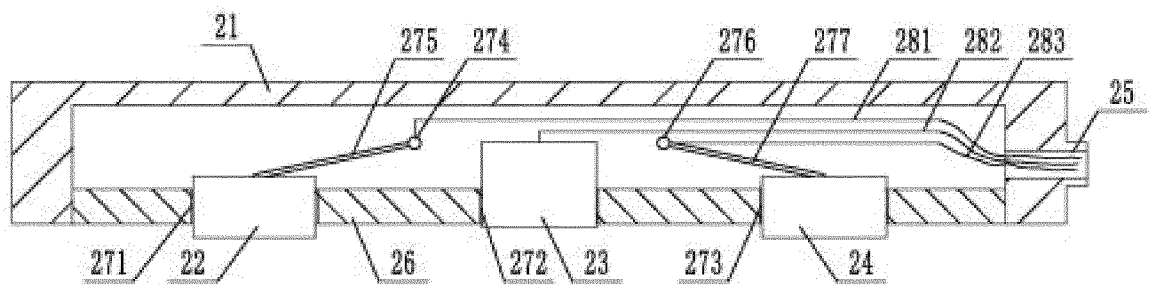


FIG. 6

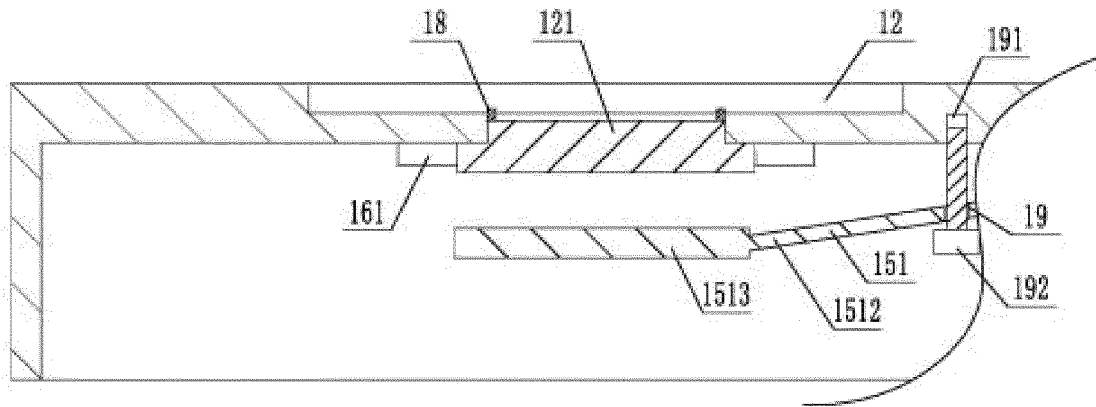


FIG. 7

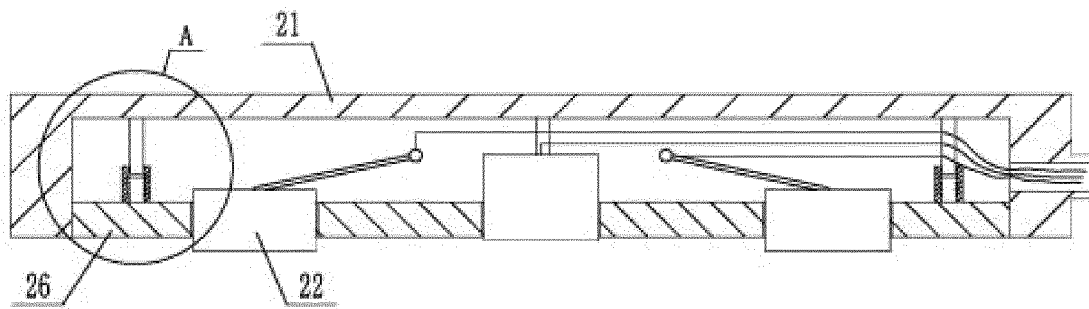


FIG. 8

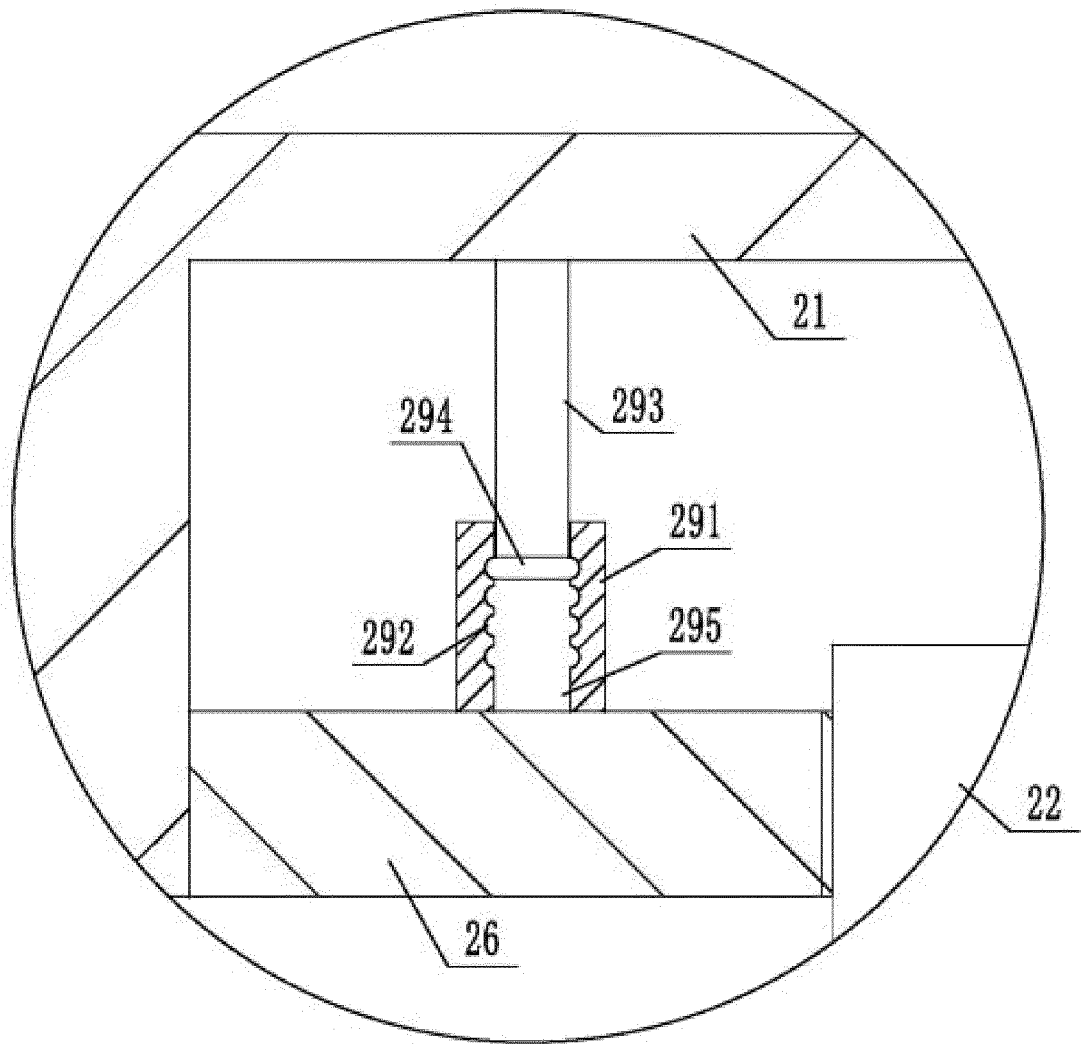


FIG.9

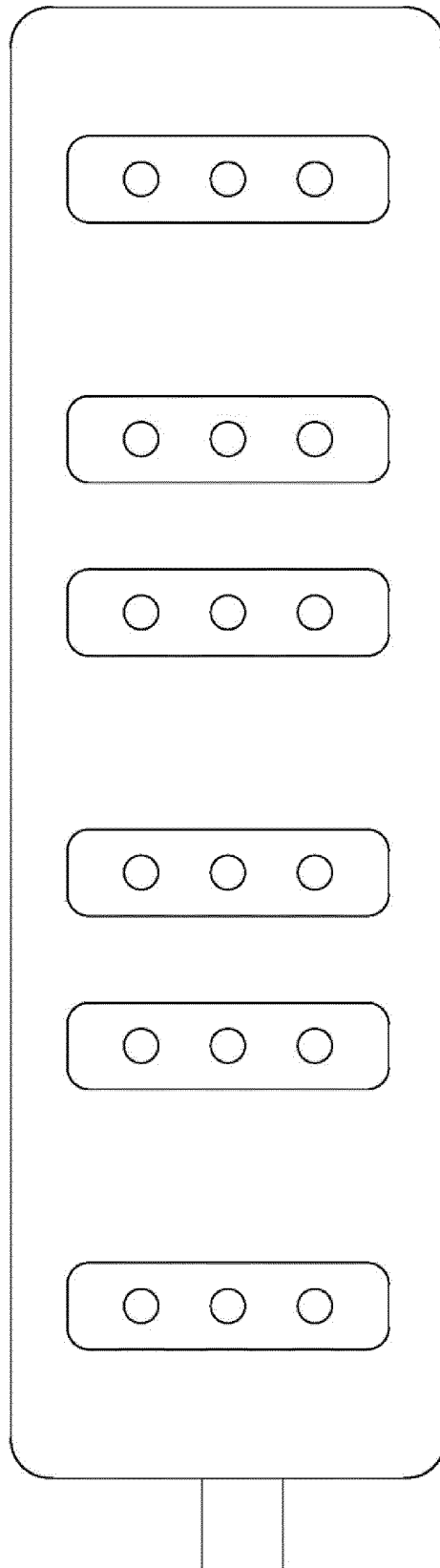


FIG.10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/078856

A. CLASSIFICATION OF SUBJECT MATTER H01R 13/639(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) H01R 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) CNABS; CNTXT; VEN; USTXT; WOTXT; EPTXT; CNKI: 磁, 铜, 螺栓, 板, 地, 插入, 导电, 高度, 弹性, 插座, magnet, copper, bolt, plate, ground, plug, conduct, height, elasticity, socket																				
C. DOCUMENTS CONSIDERED TO BE RELEVANT																				
<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>PX</td> <td>CN 111342285 A (QINGDAO WENJI MEDICAL TECHNOLOGY CO., LTD.) 26 June 2020 (2020-06-26) description, paragraphs 31-53, figures 1-10</td> <td>1-9</td> </tr> <tr> <td>X</td> <td>US 3521216 A (TOLEGIAN, Manuel Jerair) 21 July 1970 (1970-07-21) description, columns 3-7, figures 1-8</td> <td>1-7, 9</td> </tr> <tr> <td>X</td> <td>CN 201466289 U (XU, Dongdong) 12 May 2010 (2010-05-12) description, paragraphs 7-10, figures 1-3</td> <td>1-7, 9</td> </tr> <tr> <td>A</td> <td>CN 209472179 U (FUZHOU YUANYI INTERNET OF THINGS TECHNOLOGY CO., LTD.) 08 October 2019 (2019-10-08) entire document</td> <td>1-9</td> </tr> <tr> <td>A</td> <td>CN 110534977 A (HENAN PURUN INSTRUMENT EQUIPMENT CO., LTD.) 03 December 2019 (2019-12-03) description, paragraphs 22-38, figures 1-5</td> <td>1-9</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	PX	CN 111342285 A (QINGDAO WENJI MEDICAL TECHNOLOGY CO., LTD.) 26 June 2020 (2020-06-26) description, paragraphs 31-53, figures 1-10	1-9	X	US 3521216 A (TOLEGIAN, Manuel Jerair) 21 July 1970 (1970-07-21) description, columns 3-7, figures 1-8	1-7, 9	X	CN 201466289 U (XU, Dongdong) 12 May 2010 (2010-05-12) description, paragraphs 7-10, figures 1-3	1-7, 9	A	CN 209472179 U (FUZHOU YUANYI INTERNET OF THINGS TECHNOLOGY CO., LTD.) 08 October 2019 (2019-10-08) entire document	1-9	A	CN 110534977 A (HENAN PURUN INSTRUMENT EQUIPMENT CO., LTD.) 03 December 2019 (2019-12-03) description, paragraphs 22-38, figures 1-5	1-9		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																		
PX	CN 111342285 A (QINGDAO WENJI MEDICAL TECHNOLOGY CO., LTD.) 26 June 2020 (2020-06-26) description, paragraphs 31-53, figures 1-10	1-9																		
X	US 3521216 A (TOLEGIAN, Manuel Jerair) 21 July 1970 (1970-07-21) description, columns 3-7, figures 1-8	1-7, 9																		
X	CN 201466289 U (XU, Dongdong) 12 May 2010 (2010-05-12) description, paragraphs 7-10, figures 1-3	1-7, 9																		
A	CN 209472179 U (FUZHOU YUANYI INTERNET OF THINGS TECHNOLOGY CO., LTD.) 08 October 2019 (2019-10-08) entire document	1-9																		
A	CN 110534977 A (HENAN PURUN INSTRUMENT EQUIPMENT CO., LTD.) 03 December 2019 (2019-12-03) description, paragraphs 22-38, figures 1-5	1-9																		
<input type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.																			
<p>* Special categories of cited documents:</p> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“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)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“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</p> <p>“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</p> <p>“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</p> <p>“&” document member of the same patent family</p>																			
Date of the actual completion of the international search 01 June 2021	Date of mailing of the international search report 08 June 2021																			
Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088 China Facsimile No. (86-10)62019451	Authorized officer Telephone No.																			

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2021/078856

Patent document cited in search report			Publication date (day/month/year)		Patent family member(s)		Publication date (day/month/year)	
CN	111342285	A	26 June 2020		None			
US	3521216	A	21 July 1970		None			
CN	201466289	U	12 May 2010		None			
CN	209472179	U	08 October 2019		None			
CN	110534977	A	03 December 2019		CN	110534977	B	04 December 2020

Form PCT/ISA/210 (patent family annex) (January 2015)