



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.03.2023 Bulletin 2023/13

(51) International Patent Classification (IPC):
E05B 85/12^(2014.01) E05B 81/76^(2014.01)

(21) Application number: **22187331.8**

(52) Cooperative Patent Classification (CPC):
E05B 85/12; E05B 81/76

(22) Date of filing: **27.07.2022**

(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

(30) Priority: **24.09.2021 CN 202122320670 U**

(71) Applicants:
• **ZEEKR Automobile Co., Ltd.**
Ningbo City 315336 (CN)
• **Zhejiang Geely Holding Group Co., Ltd.**
Hangzhou, Zhejiang 310051 (CN)

(72) Inventors:
• **BI, Yuanfei**
Ningbo City, Zhejiang Province, 315336 (CN)
• **GAO, Jiang**
Ningbo City, Zhejiang Province, 315336 (CN)
• **REN, Zhipei**
Ningbo City, Zhejiang Province, 315336 (CN)
• **DING, Sanlin**
Ningbo City, Zhejiang Province, 315336 (CN)
• **SHI, Miao**
Ningbo City, Zhejiang Province, 315336 (CN)

(74) Representative: **2K Patentanwälte Blasberg Kewitz & Reichel**
Partnerschaft mbB
Schumannstrasse 27
60325 Frankfurt am Main (DE)

(54) **INNER HANDLE FOR AUTOMOBILE AND APPLICATION THEREOF**

(57) The disclosure provides an inner handle for an automobile, specifically related to the automotive field. The inner handle for automobile includes a base, a handle, a reset assembly and a driving assembly. The handle is rotatably connected with the base. The reset assembly is located between the handle and the base. The driving assembly is connected with the handle. The driving assembly includes an electronic module and a mechanical module. The electronic module includes a switch and a

first driving component. During a rotation of the handle, the first driving component is allowed to trigger the switch. The mechanical module includes a second driving component and a pulling wire. During the rotation of the handle, the second driving component is allowed to pull the pulling wire. The disclosure may solve the problem that a car door is difficult to open when an electric opening of the vehicle door is abnormal.

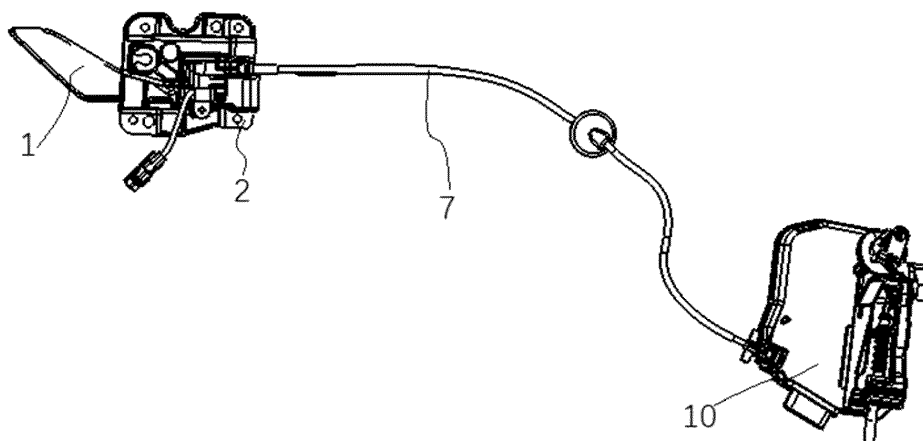


Figure 1

Description

TECHNICAL FIELD

[0001] The disclosure belongs to the technical field of automobile, and particularly relates to an inner handle for an automobile and application thereof.

BACKGROUND

[0002] In an opening and closing technology of a car door, the opening and closing of the electric car door may be performed through an electric switch, or the opening and closing of the electric car door may be performed through a mechanical inner handle arranged on the door body. The electric switch and the mechanical inner handle are in a split setting, so there are certain requirements for a layout and setting of the electric switch and the mechanical inner handle.

SUMMARY

[0003] The disclosure provides an inner handle for an automobile to solve the problem that a car door is difficult to open when an electric opening of the vehicle door is abnormal.

[0004] The disclosure provides an inner handle for an automobile. The inner handle for automobile includes a base, a handle, a reset assembly and a driving assembly. The handle is rotatably connected with the base. The reset assembly is located between the handle and the base. The driving assembly is connected with the handle and includes an electronic module and a mechanical module. The electronic module includes a switch and a first driving component, and the first driving component is allowed to trigger the switch during a rotation of the handle. The mechanical module includes a second driving component and a pulling wire, and the second driving component is allowed to pull the pulling wire during the rotation of the handle.

[0005] In an embodiment of the disclosure, the inner handle for the automobile further includes a pin shaft, and the handle is rotatably connected on the pin shaft.

[0006] In an embodiment of the disclosure, the reset assembly includes a torsion spring, and the torsion spring is located between the handle and the base.

[0007] In an embodiment of the disclosure, the first driving component is connected with the handle.

[0008] In an embodiment of the disclosure, the first driving component includes a protrusion and a notch.

[0009] In an embodiment of the disclosure, the switch comprises a contacting point, and the contacting point is located in the notch.

[0010] In an embodiment of the disclosure, the second driving component is connected with the handle.

[0011] The disclosure further provides a car door applied with the inner handle for automobile. The car door includes a door body, a locking structure and an inner

handle. The locking structure is arranged on the door body. The inner handle includes a base, a handle, a reset assembly and a driving assembly. The handle is rotatably connected with the base. The reset assembly is located between the handle and the base. The driving assembly is connected with the handle and includes an electronic module and a mechanical module. The electronic module includes a switch and a first driving component, and the first driving component is allowed to trigger the switch during a rotation of the handle. The mechanical module includes a second driving component and a pulling wire, and the second driving component is allowed to pull the pulling wire during the rotation of the handle.

[0012] In an embodiment of the disclosure, the car door further includes a motor. An output end of the motor is connected with the locking structure.

[0013] In an embodiment of the disclosure, one end of the pulling wire is connected with the second driving component, and the other end of the pulling wire is connected with the locking structure.

[0014] In summary, the disclosure provides the inner handle for the automobile. By arranging the switch of an electric car door on the handle, the switch may be first touched to realize an electric opening of the car door during an opening process of the handle. When the door is opened, the handle continues to be pulled and reach an unlocking state to realize a mechanical unlocking of a door locking mechanism. By arranging the switch of the car door in the inner handle, additional electric switches may be avoided, so as to improve an actual use effect of the inner handle, which effectively reduces a risk that the car door may not be opened when the electric door is opened abnormally.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] In order to explain the technical solutions of the embodiments of the disclosure more clearly, the following will briefly introduce the drawings used in the description of the embodiments. Obviously, the drawings in the following description are only some embodiments of the disclosure. For those of ordinary skill in the art, other drawings can be obtained from these drawings without creative work.

FIG. 1 is a schematic view of an inner handle for an automobile applied on a car door in an embodiment of the disclosure.

FIG. 2 is a schematic structural view of the inner handle for the automobile in an embodiment of the disclosure.

FIG. 3 is schematic structural view of a top view of the inner handle for the automobile in an embodiment of the disclosure.

FIG. 4 is a schematic view of a first driving component of the inner handle for the automobile in an embodiment of the disclosure.

FIG. 5 is a schematic structural view of a state of a

triggered switch of the inner handle for the automobile in an embodiment of the disclosure.

FIG. 6 is a schematic structural view of another state of a top view of the inner handle for the automobile in an embodiment of the disclosure.

FIG. 7 is a schematic structural view of a pulling wire which is pulled in an embodiment of the inner handle for an automobile of the disclosure.

PART NUMBER DESCRIPTION

[0016] 1-handle, 2-base, 3-reset assembly, 301-pin shaft, 302-torsion spring, 4-switch, 5-contacting point, 6-first driving component, 601-protrusion, 602-notch, 7-pulling wire, 8-second driving component, 10-locking structure.

DETAILED DESCRIPTION

[0017] The following describes the implementation of the disclosure through specific embodiments, and those skilled in the art can easily understand other advantages and effects of the disclosure from the content disclosed in this specification. The disclosure may also be implemented or applied through other different specific embodiments. Various details in this specification may also be modified or changed based on different viewpoints and applications without departing the subject-matter of the appending claims. It should be noted that following embodiments and features in the embodiments may be combined with each other under a condition of no conflict. It should also be understood that terms used in the embodiments of the disclosure are used to describe specific embodiments, rather than to limit a protection scope of the disclosure. In the following embodiments, test methods without specific conditions are usually in accordance with conventional conditions or in accordance with conditions suggested by various manufacturers.

[0018] Please refer to FIG. 1. The disclosure provides an inner handle for an automobile, which may be arranged on a door body to drive the door body to be opened and closed. A locking structure 10 is usually arranged between the door body and the vehicle body, and a connection between the vehicle body and the door body is realized through the locking structure 10. Therefore, an unlocking and locking of the locking structure 10 may be adjusted by driving the inner handle for automobiles, thereby driving an opening and closing of the door body.

[0019] Please refer to FIG. 1. In some embodiments, a specific structure of the locking structure 10 may not be limited, for example, the locking structure 10 may include a locking cylinder and a locking groove. A locking of the locking structure 10 is realized by clamping the locking cylinder with the locking groove, and an unlocking of the locking structure 10 is realized by separating the locking cylinder from the locking groove. And an unlocking method of the locking structure 10 is not limited, for example, the locking structure 10 may be unlocked by a

mechanical module, or the locking structure 10 may be unlocked by an electronic module. An unlocking of the mechanical module means that during an unlocking process of the locking structure 10, the locking structure 10 is driven by a mechanical mechanism of the mechanical module to realize the unlocking of the locking structure 10. Therefore, during an unlocking process of the mechanical module, there is no additional power input. Further, an unlocking of the electronic module means that during the unlocking process of the locking structure 10, the locking structure 10 is driven by a circuit control of the electronic module to realize the unlocking of the locking structure 10. Therefore, during an unlocking process of the electronic module, there is no input from the mechanical module. By setting the locking structure 10 with multiple unlocking methods such as mechanical modules and electronic modules, an actual use effect of the locking structure 10 may be improved.

[0020] In some embodiments, the inner handle for automobile may be connected with the mechanical module and the electronic module at the same time. Therefore, by driving the inner handle for automobile, the unlocking and locking of the locking structure 10 can be adjusted, thereby driving the opening and closing of the door body.

[0021] Please refer to FIG. 2. In some embodiments, the inner handle for automobile may include a handle 1, a base 2 and a reset assembly 3. The base 2 is connected with the door body, and the handle 1 is rotatably connected with the base 2. A pin shaft 301 may be connected with the base 2, and a through hole may be arranged on the handle 1. Therefore, the handle 1 rotates relative to the pin shaft 301 by rotatably connecting the through hole on the handle 1 with the pin shaft 301. Therefore, the handle 1 may rotate relative to the pin shaft 301 to realize a rotational connection between the handle 1 and the base 2. The reset assembly 3 is located between the handle 1 and the base 2, so when the handle 1 rotates relative to the base 2 by a certain angle, the reset assembly 3 is configured to reset the handle 1. Therefore, after the door body is opened, the handle 1 may be quickly reset through the reset assembly 3. A specific structure of the reset assembly 3 may not be limited. For example, in an embodiment, the reset assembly 3 may include a torsion spring 302. Specifically, the torsion spring 302 is connected between the base 2 and the handle 1, so that the handle 1 may be reset in time after rotating.

[0022] Please refer to FIG. 3 through FIG. 5. In some embodiments, the handle 1 is connected with the electronic module, and the electronic module may include a switch 4, a motor and a first driving component 6. The switch 4 is connected with a control circuit of the motor, so the motor may be driven to rotate by triggering the switch 4. A specific structure of the switch 4 may not be limited. In one embodiment, the switch 4 may be a micro switch. Therefore, through the micro switch, a triggering precision of the switch 4 may be improved, so as to improve an actual use effect of the electronic module. Further, an output end of the motor is connected with the

locking cylinder, so during a rotation of the motor, the locking cylinder may be driven to be separated from the locking groove. As long as the locking cylinder may be driven to move by the motor, a specific connection between the output end of the motor and the locking cylinder may not be limited. For example, in some embodiments, a rack may be connected to the locking cylinder, a gear is connected to the output end of the motor, and the gear and the rack are in a meshing connection. Therefore, through the rotation of the motor, the gear drives the rack to move, thereby driving the locking cylinder to move. Specifically, the first driving component 6 is connected with the handle 1, and the first driving component 6 and the handle 1 are fixedly connected with each other, so the first driving component 6 may rotate synchronously with the handle 1. Therefore, when the first driving component 6 rotates, the switch 4 is triggered to drive the motor to rotate, thereby driving the lock cylinder to move. In order to improve a practical use effect of the first driving component 6, in one embodiment, the first driving component 6 is provided with a notch 602 and a protrusion 601. When the handle 1 is in a non-rotating state, a contacting point 5 of the switch 4 is located in the notch 602, and there may be a certain gap between the first driving component 6 and the contacting point 5. Therefore, by setting the gap between the first driving component 6 and the contacting point 5, it is possible to avoid touching the micro switch by mistake, so as to improve the actual use effect of the electronic module. When the handle 1 rotates at a certain angle, the protrusion 601 is in contact with the contacting point 5 of the switch 4 to trigger the switch 4. Specifically, when the protrusion 601 and the switch 4 are triggered, a rotation angle of the handle 1 may not be limited. For example, in one embodiment, when the protrusion 601 and the switch 4 are triggered, the rotation angle of the handle 1 may be from 10 degrees to 20 degrees.

[0023] Please refer to FIG. 6 and FIG. 7. In some embodiments, the handle 1 is connected with the mechanical module, and the mechanical module may include a pulling wire 7 and a second driving component 8. Wherein, one end of the pulling wire 7 is connected with the locking cylinder, and the locking cylinder may be driven to be separated from the locking groove by pulling the pulling wire 7. The other end of the pulling wire 7 is connected with the second driving component 8, so the pulling wire 7 may be pulled by driving the second driving component 8. Specifically, the second driving component 8 is connected on the handle 1 and is fixedly connected with the handle 1. During the rotation of the handle 1, the second driving component 8 may rotate synchronously with the handle 1. Therefore, when the handle 1 rotates at a certain angle, the second driving component 8 pulls the pulling wire 7, and drives the locking cylinder to be separated from the locking groove through the pulling wire 7. When the locking cylinder is driven to be separated from the locking groove by the pulling wire 7, the rotation angle of the handle 1 may not be limited. For example,

in one embodiment, when the pulling wire 7 drives the locking cylinder to be separated from the locking groove, the rotation angle of the handle 1 may be at least 25 degrees.

[0024] Wherein, the first driving component 6 and the second driving component 8 may also be set as an integral structure, so as to improve a utilization rate of a space of the inner handle for automobile. For example, in one embodiment, a driving component is connected with the handle 1. The driving component is provided with the protrusion 601 and the notch 602, and the pulling wire 7 is also connected with the driving component. Therefore, when the door body is not opened, the contacting point 5 of the micro switch is located in the notch 602. When the handle 1 is opened at a certain angle, for example, when the angle is from 10 degrees to 20 degrees, the protrusion 601 triggers the contacting point 5 of the micro switch. The contacting point 5 of the micro switch is triggered by the protrusion 601 to turn on the motor and unlock the locking structure 10. Further, when the handle 1 is continuously opened at a certain angle, for example, when the angle is greater than 25 degrees, the second driving component 8 pulls the pulling wire 7 and drives the locking cylinder to be separated from the locking groove through the pulling wire 7. The pulling wire 7 is pulled by the driving component 8 to realize an unlocking of the locking structure 10.

[0025] In summary, the disclosure provides the inner handle for automobile, which is provided with the micro switch of the electric door on the handle. In an opening process of the handle of the inner handle, first the micro switch is touched to realize an opening of the electric door. Then the handle continues to be pulled after touching the micro switch, in order to reach an unlocking state to achieve a mechanical unlocking. Therefore, by arranging an electric switch of a vehicle door in the inner handle, an additional electric switch is avoided, and the actual use effect of the inner handle is improved.

[0026] The above-mentioned embodiments merely illustrate the principles and effects of the disclosure, but are not intended to limit the disclosure. Anyone skilled in the art may modify or change the above embodiments without departing from the range of the disclosure. Therefore, all equivalent modifications or changes made by those with ordinary knowledge in the technical field without departing from the range and technique disclosed in the disclosure should still be covered by the claims of the disclosure.

Claims

1. An inner handle for an automobile, comprising:

- a base,
- a handle, rotatably connected with the base,
- a reset assembly, located between the handle and the base, and

a driving assembly, connected with the handle,
comprising:

- an electronic module, comprising a switch
and a first driving component, the first driv- 5
ing component configured to trigger the
switch during a rotation of the handle, and
a mechanical module, comprising a second
driving component and a pulling wire, the 10
second driving component configured to
pull the pulling wire during the rotation of
the handle.
- 2. The inner handle for the automobile according to
claim 1, further comprising a pin shaft, wherein, 15
the pin shaft is connected with the base, and the
handle is rotatably connected on the pin shaft.
- 3. The inner handle for the automobile according to any
preceding claims, wherein the reset assembly com- 20
prises a torsion spring, and the torsion spring is lo-
cated between the handle and the base.
- 4. The inner handle for the automobile according to any
preceding claims, wherein the first driving compo- 25
nent is connected with the handle.
- 5. The inner handle for the automobile according to any
preceding claims, wherein the first driving compo- 30
nent comprises a protrusion and a notch.
- 6. The inner handle for the automobile according to
claim 5, wherein the switch comprises a contacting
point, and the contacting point is located in the notch. 35
- 7. The inner handle for the automobile according to any
preceding claims, wherein the second driving com-
ponent is connected with the handle.
- 8. A car door, comprising: 40

 - a door body,
 - a locking structure, arranged on the door body,
and
 - an inner handle according to any one of claims 45
1 to 7,
the base being connected with the door body.
- 9. The car door according to claim 8, further comprising
a motor, wherein 50
an output end of the motor is connected with the
locking structure.
- 10. The car door according to claim 8 or claim 9, wherein
one end of the pulling wire is connected with the sec- 55
ond driving component, and the other end of the pull-
ing wire is connected with the locking structure.

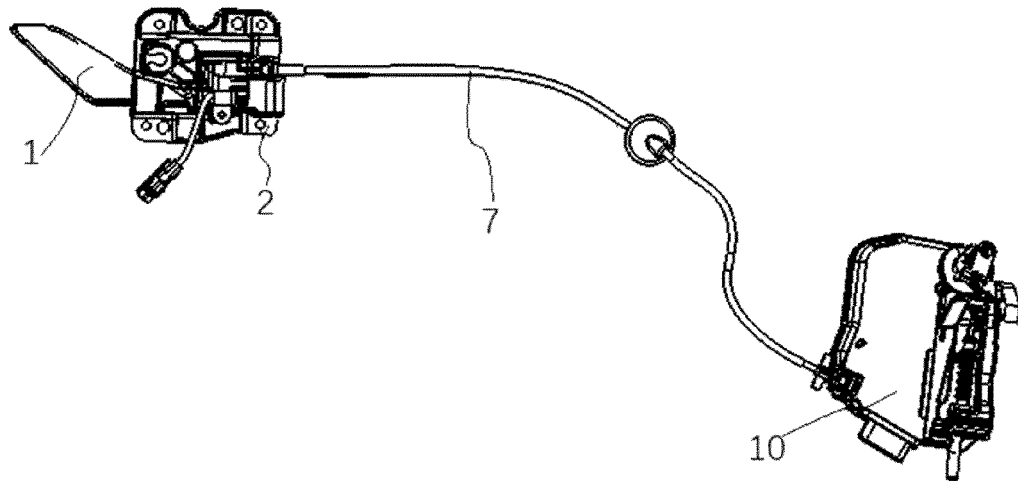


Figure 1

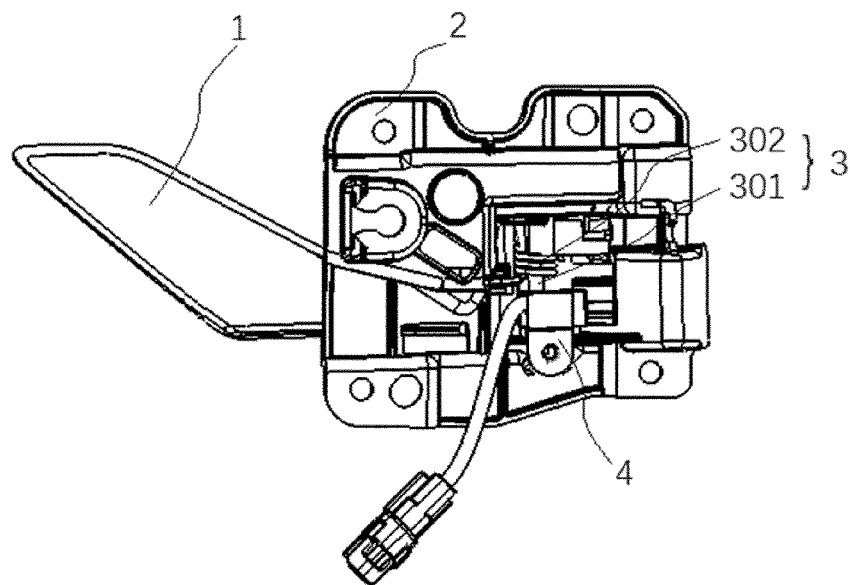


Figure 2

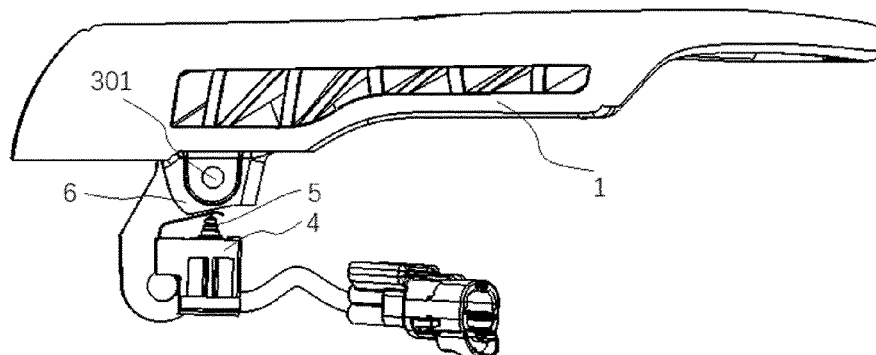


Figure 3

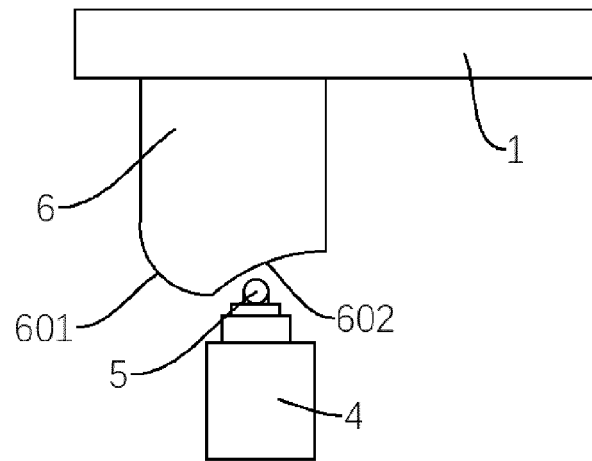


Figure 4

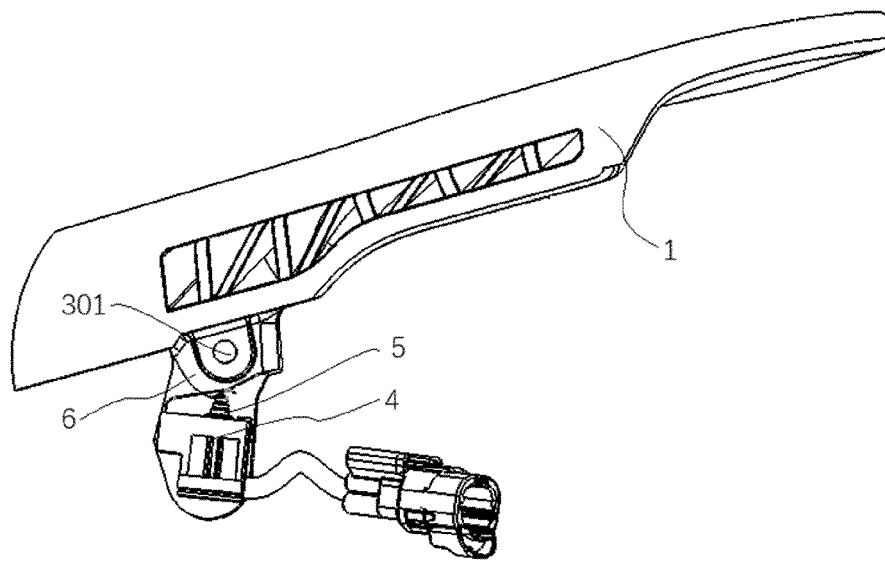


Figure 5

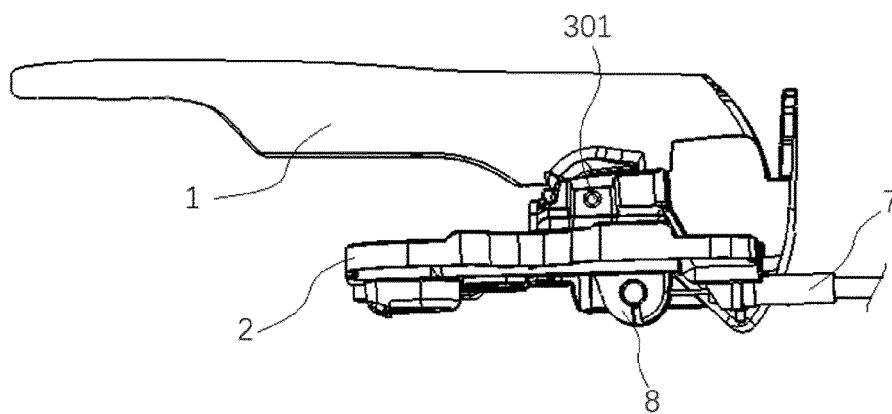


Figure 6

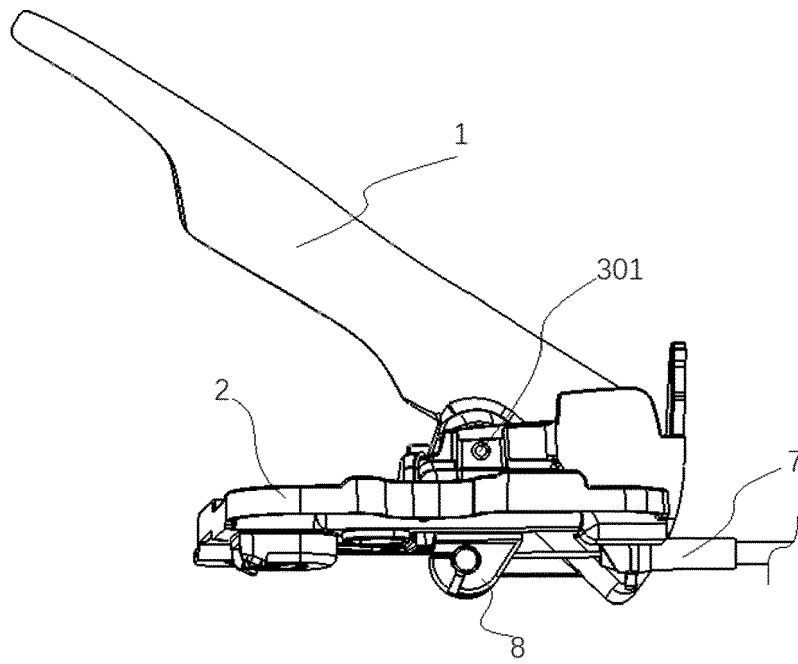


Figure 7



EUROPEAN SEARCH REPORT

Application Number

EP 22 18 7331

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

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	CN 210 563 903 U (NINGBO HUADE AUTOMOBILE PARTS CO LTD) 19 May 2020 (2020-05-19) * the whole document *	1-10	INV. E05B85/12 E05B81/76
X	WO 2013/189695 A1 (BAYERISCHE MOTOREN WERKE AG) 27 December 2013 (2013-12-27) * the whole document *	1-10	
X	DE 20 2016 106647 U1 (KARL HESS GMBH & CO KG KUNSTSTOFFVERARBEITUNG) 4 January 2017 (2017-01-04) * paragraphs [0036], [0037] *	1, 8-10	
A	WO 2021/075301 A1 (U SHIN LT) 22 April 2021 (2021-04-22) * figures *	1-6, 8, 9	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 December 2022	Examiner Van Beurden, Jason
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 18 7331

5

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-12-2022

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 210563903 U	19-05-2020	NONE	

WO 2013189695 A1	27-12-2013	DE 102012210278 A1	19-12-2013
		WO 2013189695 A1	27-12-2013

DE 202016106647 U1	04-01-2017	NONE	

WO 2021075301 A1	22-04-2021	CN 114585792 A	03-06-2022
		DE 112020005008 T5	25-08-2022
		JP WO2021075301 A1	22-04-2021
		WO 2021075301 A1	22-04-2021

15

20

25

30

35

40

45

50

55

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82