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(71) Applicant: **Dongguan Prestige Sporting Products Co., Ltd.**
Dongguan, Guangdong 523960 (CN)

(72) Inventor: **ZHANG, Zhao**
Dongguan
Guangdong 523960 (CN)

(74) Representative: **Meyer, Thorsten**
Meyer Patentanwaltskanzlei
Pfarrer-Schultes-Weg 14
89077 Ulm (DE)

(54) LADDER POST LOCKING DEVICE FOR EXTENSION LADDER

(57) A ladder post locking device (100) for an extension ladder comprises a latch pin (1), a button (2), an indication component (3), a display component (4) and an elastic member (5). The latch pin (1) is movably provided inside a rung (200) of an extension ladder. The button (2) is provided at the rung (200) and used to drive the latch pin (1) to perform a locking operation or an unlocking operation on an upper ladder post (301) and a lower ladder post (302) which are sleeved together. The display component (4) is fixed at an outer side of the rung (200) and has at least two display regions. The indication component (3) moves with a movement of the button (2) or the latch pin (1) to point to the corresponding display region. The ladder post locking device (100) for an extension ladder can indicate whether a ladder post of an extension ladder is locked or unlocked, thereby improving usage safety.

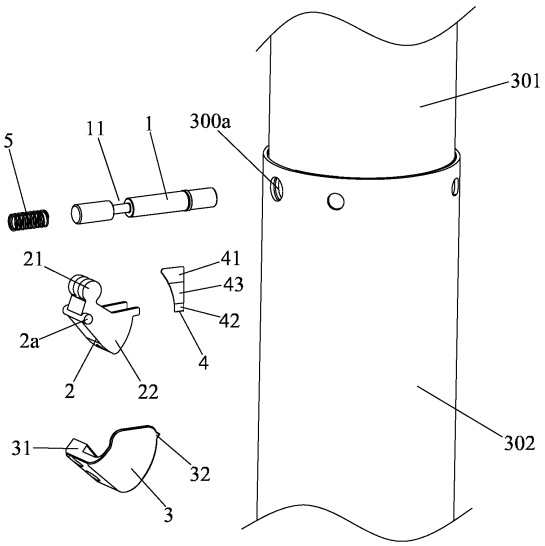

Fig.4

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to an extension ladder, and more particularly to a ladder leg locking device for extension ladders.

BACKGROUND OF THE INVENTION

[0002] Currently, the existing extension ladder generally includes a rung, a ladder leg locking mechanism, and a plurality of nested ladder legs that are locked by the ladder leg locking mechanisms, so that the extension ladder is locked in an unfolded state. When to fold the extension ladder, a button is pressed to withdraw a locking pin from locking holes of the ladder legs, so that the nested ladder legs are unlocked.

[0003] However, the locking pin of the ladder leg locking mechanism is located inside the rung, and the user cannot see whether the locking pin has been accurately inserted into the locking holes of the two ladder legs. Therefore, the user determines if the locking pin has locked the ladder legs by a position and state of the button protruding from a bottom of the rung. However, rungs of the ladder are at different heights, the higher rung is easily seen by the user; and the lower rung is blocked by the rung itself, the button cannot be seen. Because the lower button is farther away from the user, it is not easy to see the button. When the locking pin is not accurately inserted into the ladder legs and the extension ladder is not locked in a safe position, the extension ladder is easily accidentally unfolded when the user climbs the extension ladder thereby causing safety problems.

SUMMARY OF THE INVENTION

[0004] One objective of the present invention is to provide a ladder leg locking device capable of showing whether the ladder legs of the extension ladder are locked or unlocked and improving the safety of extension ladder.

[0005] To achieve the above-mentioned objective, a ladder leg locking device for extension ladders includes a locking pin, a control member, an indication member and a display member. Specifically, the locking pin is movably disposed in a rung of the extension ladder, and the control member is disposed on the rung and controls the locking pin to lock or unlock nested upper and lower ladder legs. Furthermore, the display member is fixed to an outer side of the rung and provided with at least two display areas, and the indication member is moved as the control member or the locking pin moves and indicated on the corresponding display area.

[0006] In comparison with the prior art, since an indication member and a display member are disposed on the extension ladder, and the indication member is moved as the control member or the locking pin moves. Furthermore, the display member is disposed at an outer side of the rung thereby driving the indication member indicating on different display areas of the display member. By setting a mark on each display area, the user can quickly determine whether the locking pin is inserted into the locking hole, thereby knowing whether the extension ladder can be safely used in certain state, thereby avoiding accidents and effectively improving safety of the extension ladder.

[0007] Preferably, the indication member is fixed to the control member. Since the control member drives the locking pin to lock or unlock the ladder legs, when the locking pin is moved, the indication member is actuated and synchronously indicated to a certain area of the display member.

[0008] Preferably, the indication member includes a fixing portion. One end of the fixing portion is fixed to the control member, and the other end of the fixing portion is bent and extended to an outer side of the rung to form an indication portion indicated the display area.

[0009] Preferably, the locking pin is horizontally slidably disposed on the rung, and the control member is pivotally connected to the rung and one end of the control member is engaged with the locking pin.

[0010] Preferably, the control member is provided with two arc-shaped clamping parts, the locking pin is opened with an annular clamping slot, and the two clamping parts are arranged in the clamping slot to clamp the locking pin.

[0011] Preferably, the control member is provided with a pressing portion which is exposed form a bottom of the rung, and the indication member is fixed to the pressing portion.

[0012] Preferably, the ladder leg locking device for extension ladders further includes an elastic member which exerts an elastic force that urges the locking pin to lock the upper and the lower ladder legs.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

Fig. 1 is a front view of an extension ladder with a ladder leg locking device according to one embodiment of the present invention;

Fig. 2 is a partial view of an extension ladder with a ladder leg locking device;

Fig. 3 is a partial view showing an extension ladder where the ladder leg locking device is locked;

Fig. 4 is an exploded view of the ladder leg locking device according to one embodiment of the present invention; and

Fig. 5 is a partial view showing an extension ladder where the ladder leg locking device is unlocked.

DETAILED DESCRIPTION OF ILLUSTRATED EMBODIMENTS

[0014] A distinct and full description of the technical solution of the present invention will follow by combining

with the accompanying drawings.

[0015] As shown in Figs. 1 to 4, a ladder leg locking device 100 for the extension ladder in this application can be disposed on a rung 200 of any U-shaped ladder section of the extension ladder. In this embodiment, the ladder leg locking device 100 is disposed on the rung 200 of the first ladder section of the extension ladder, and the other ladder sections use the existing ladder leg locking device.

[0016] Referring to Figs. 3 and 4, the ladder leg locking device 100 for extension ladders includes a locking pin 1, a control member 2, an indication member 3, a display member 4, and an elastic member 5. Specifically, the locking pin 1 is movably disposed in a rung 200 of the extension ladder, and the elastic member 5 is a compression spring disposed between the locking pin 1 and the rung 200, and an elastic force of the spring drives the locking pin 1 to slidably insert into the locking holes 300a of the ladder legs. Furthermore, the control member 2 is disposed on the rung 200 and controls the locking pin 1 to lock or unlock nested upper ladder leg 301 and lower ladder leg 302. Furthermore, the display member 4 is fixed to an outer side of the rung 200 and provided with a plurality of display areas, and the indication member 3 is moved as the control member 2 or the locking pin 1 moves and indicated on the corresponding display area. Preferably, the elastic member 5 exerts an elastic force that drives the locking pin 1 to lock the upper ladder leg 301 and lower ladder leg 302.

[0017] Specifically, as follows.

[0018] Referring to Figs. 3 and 4 again, the locking pin 1 is horizontally slidably disposed on the rung 200, and the control member 2 is pivotally connected to the rung 200 via a pivot shaft 2a. Preferably, one end of the control member 2 is provided with two arc-shaped clamping parts 21, and the control member 2 is provided with a pressing portion 22 which is exposed outside a bottom of the rung 200. The locking pin 1 is opened with an annular clamping slot 11, and the two clamping parts 21 are arranged in the clamping slot 11 to clamp the locking pin 1.

[0019] As shown in Fig. 4, the indication member 3 is fixed to the pressing portion 22 of the control member 2. Specifically, the indication member 3 includes a fixing portion 31, one end of the fixing portion 31 is fixed to the pressing portion 22 of the control member 2, and the other end of the fixing portion 31 is bent and extended to the outer side of the rung 200 to form an indication portion 32 indicated to the display area. More specifically, the display member 4 is a color designation card, and the color designation card is provided with different color areas to form a plurality of different display areas. In this embodiment, a red display area 41 is located on an upper side of the designation card, which is marked with red color; a green display area 42 is located on an lower side of the designation card, which is marked with green color; and red-green transition color display area 43 are between the red display area 41 and the green display area 42. Since the control member 2 is used to drive the locking pin 1 to lock or unlock the ladder legs, the indication member 3 is fixed to the control member 2, therefore while the locking pin 1 moves, the indication member 3 is actuated and synchronously indicated to a certain area of the display member 4.

[0020] Referring to Figs. 3 and 5, while the locking pin 1 does not be inserted into the locking holes 300a, namely the locking pin 1 is in the unlocking position, the indication portion 32 of the indication member 3 is in a red display area 41 on the upper side of the designation card. It indicates that the locking pin 1 is withdrawn out of the locking holes 300a, and the upper ladder leg 301 and the lower ladder leg 302 are not locked. At this time, an accident is likely to occur, and the extension ladder cannot be used. While the locking pin 1 is completely accurately inserted into the locking hole 300a, the locking pin 1 drives the control member 2 to rotate clockwise, and the control member 2 simultaneously drives the indication member 3 to rotate clockwise. Thus, the indication portion 32 on the indication member 3 is rotated clockwise by a certain angle and indicates on the green display area 42, which indicates that the locking pin 1 has locked the upper ladder leg 301 and the lower ladder leg 302. At this time, the extension ladder is safe if used. Similarly, when the locking pin 1 will be inserted into the locking holes 300a but not fully entered, the indication portion 32 indicates the transition color display area 43 of the designation card. When the control member 2 is pressed to withdraw the locking pin 1 from the locking hole 300a, the locking pin 1 drives the control member 2 to rotate counterclockwise, and the control member 2 drives the indication member 3 to rotate counterclockwise. When the indication portion 32 is rotated counterclockwise into the red display area 41 of the upper side of the designation card, which indicates that the locking pin 1 is disengaged from the locking holes 300a, and the upper ladder leg 301 and the lower ladder leg 302 can be folded at this time. Firstly, the upper ladder leg 301 is unlocked and folded, and then the ladder leg locking devices on the other ladder legs are unlocked, thereby completely folding extension ladder.

[0021] In comparison with the prior art, since the indication member 3 and the display member 4 are disposed on the extension ladder, and the indication member 3 is moved as the control member 2 or the locking pin 1 moves. Furthermore, the display member 4 is disposed at an outer side of the rung 200 thereby driving the indication member 3 indicating on different display areas of the display member 4. By setting a mark on each display area, the user can quickly determine whether the locking pin 1 is inserted into the locking holes 300a, thereby knowing whether the extension ladder can be safely used in certain state and avoiding accidents and effectively improving safety of the extension ladder.

[0022] In addition, in other embodiments, the indication member 3 may be connected to the locking pin 1, and then the indication member 3 is able to horizontally slid,

and the display member 4 is further disposed along a sliding direction of the indication portion 32 of the indication member 3, so that each of the different display areas are within movement range of the indication portion 32 to show whether the ladder legs of the extension ladder are locked or unlocked.

[0023] Furthermore, the control member 2 can also be a slide button, and the slide button can drive the locking pin 1 to slide to lock or unlock the upper ladder leg 301 and the lower ladder leg 302. Then the indication member 3 is connected to the slide button to slide the indication member 3. Furthermore, the display member 4 is set according to a sliding direction of the indication portion 32 of the indication member 3 so that each of the different display areas are also within the movement range of the indication portion 32, thereby showing whether the ladder leg of the extension ladder is locked or unlocked.

[0024] While the invention has been described in connection with what are presently considered to be the most practical and preferred embodiments, it is to be understood that the invention is not to be limited to the disclosed embodiments, but on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the invention.

Claims

1. A ladder leg locking device for extension ladders, comprising a locking pin, a control member, an indication member and a display member, wherein the locking pin is movably disposed in a rung of the extension ladder, the control member is disposed on the rung and controls the locking pin to lock or unlock nested upper and lower ladder legs, the display member is fixed to an outer side of the rung and provided with at least two display areas, and the indication member is moved as the control member or the locking pin moves and indicated on the corresponding display area.

2. The ladder leg locking device for extension ladders according to claim 1, wherein the indication member is fixed to the control member.

3. The ladder leg locking device for extension ladders according to claim 2, wherein the indication member comprises a fixing portion, one end of the fixing portion is fixed to the control member, and the other end of the fixing portion is bent and extended to an outer side of the rung to form an indication portion indicated the display area.

4. The ladder leg locking device for extension ladders according to claim 1, wherein the locking pin is horizontally slidably disposed on the rung, the control member is pivotally connected to the rung, and one end of the control member is engaged with the locking pin.

5. The ladder leg locking device for extension ladders according to claim 4, wherein the control member is provided with two arc-shaped clamping parts, the locking pin is provided with an annular clamping slot, and the two clamping parts are arranged in the clamping slot to clamp the locking pin.

6. The ladder leg locking device for extension ladders according to claim 4, wherein the control member is provided with a pressing portion which is exposed form a bottom of the rung, and the indication member is fixed to the pressing portion.

7. The ladder leg locking device for extension ladders according to claim 1, further comprising an elastic member which exerts an elastic force driving the locking pin to lock the upper and the lower ladder legs.

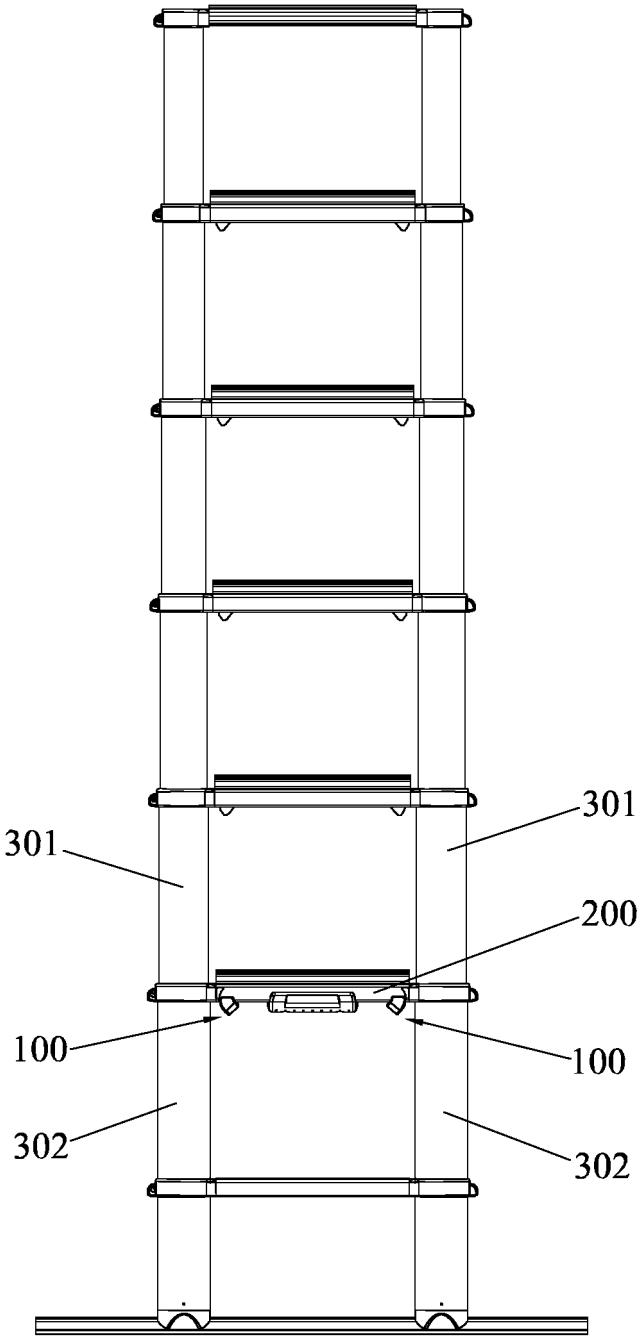

Fig.1

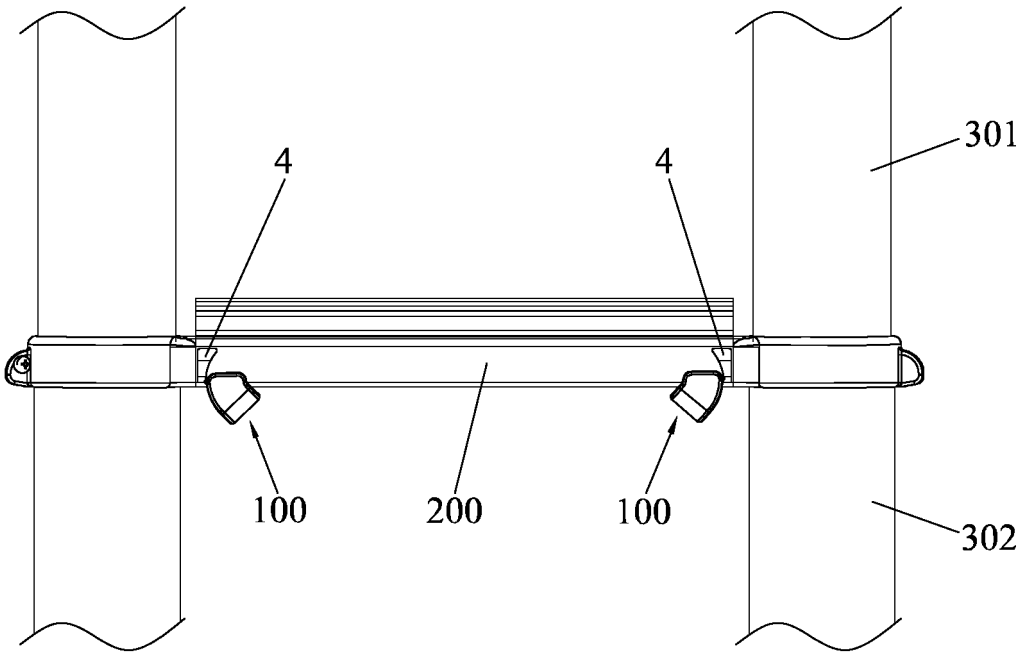

Fig.2

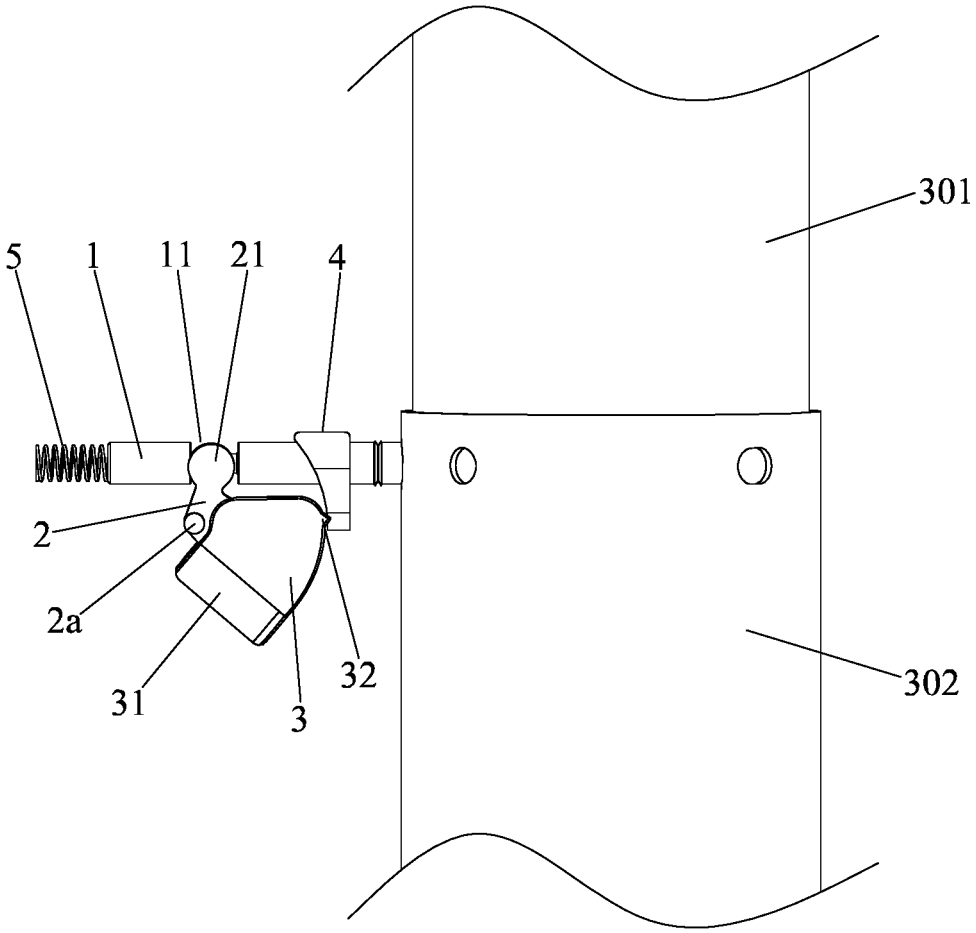

Fig.3

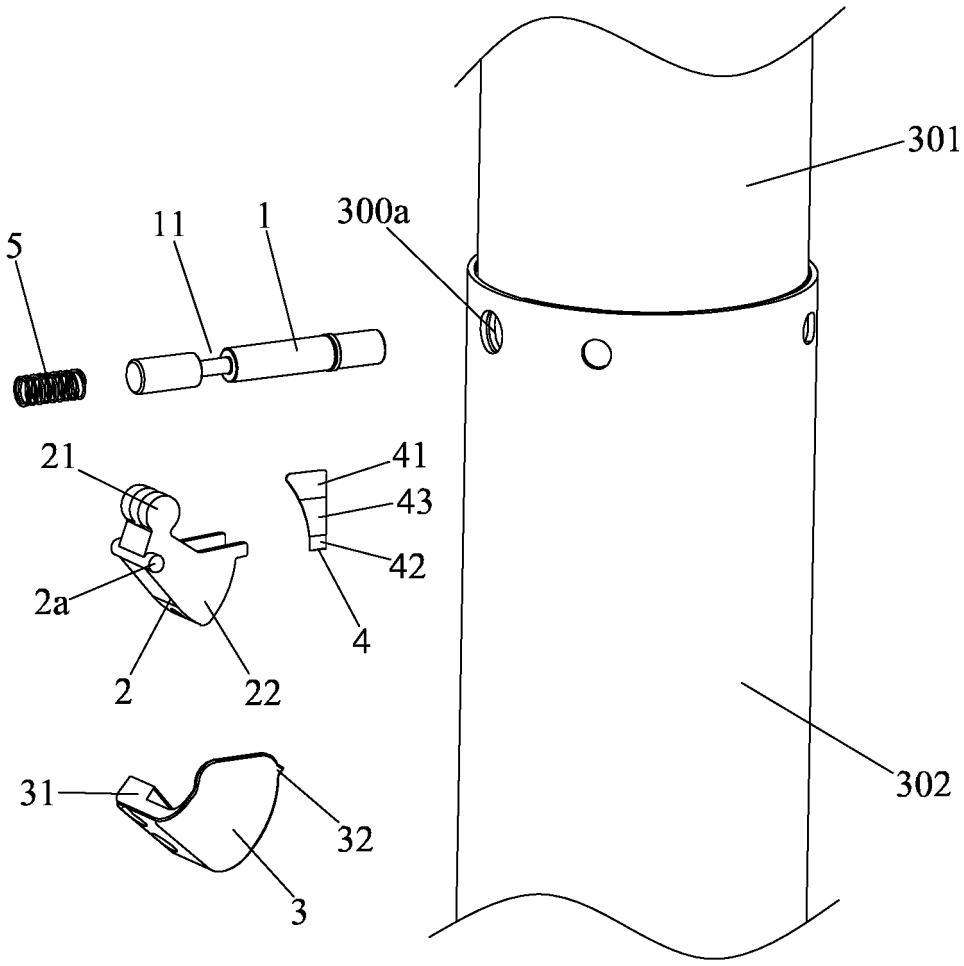

Fig.4

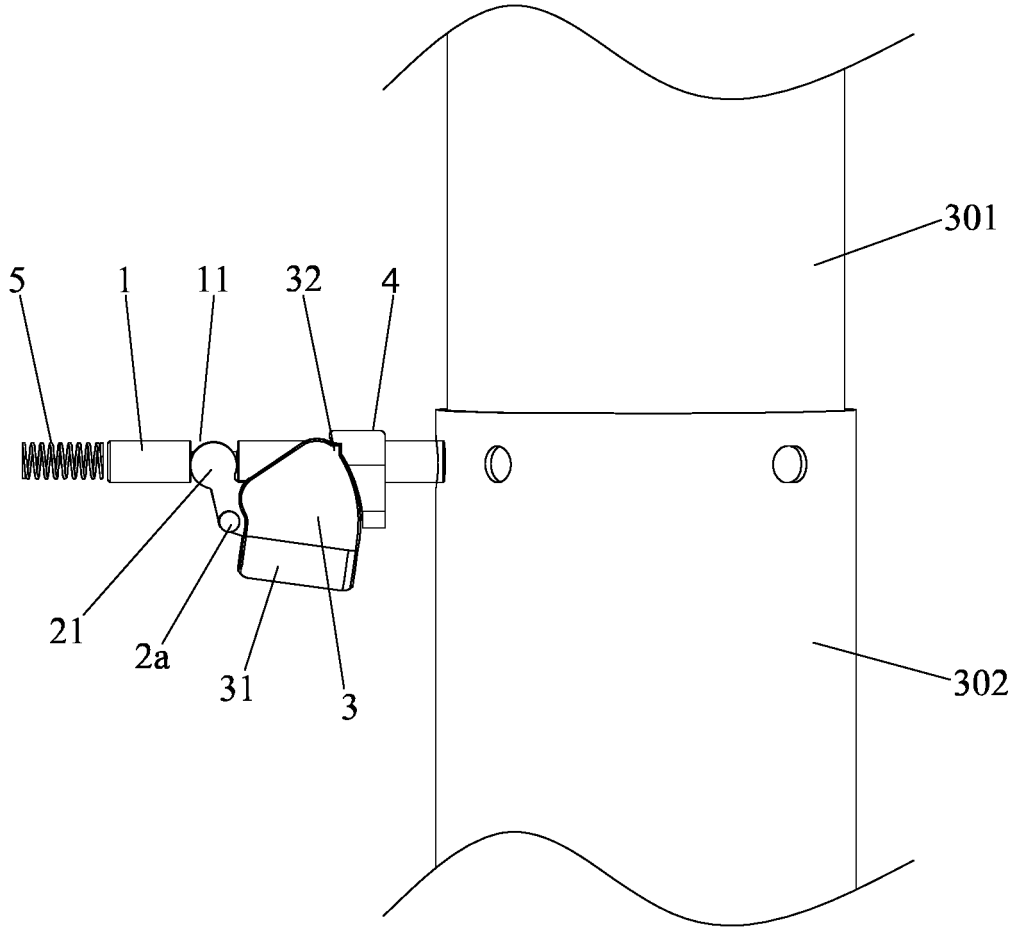

Fig.5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/095417

A. CLASSIFICATION OF SUBJECT MATTER

E06C 7/06 (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)

E06C

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, VEN, CNKI: 伸, 缩, 锁, 销, 显示, 指示, flex+, telescop+, exten+, lock+, annul, pin, forelock, direct+, indicat+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 1516775 A (TELESTEPS AB), 28 July 2004 (28.07.2004), description, page 3, line 4 to page 4, line 20, and figures 1-17	1-7
A	CN 202125240 U (YING, Xiaoping), 25 January 2012 (25.01.2012), entire document	1-7
A	US 4673061 A (ZEISET, A.L.), 16 June 1987 (16.06.1987), entire document	1-7
A	JP 2000054616 A (MORINO, M.), 22 February 2000 (22.02.2000), entire document	1-7
A	JP 2000027426 A (NIPPON LIGHT METAL CO. et al.), 25 January 2000 (25.01.2000), entire document	1-7
A	JP 2003081178 A (MORINO, M.), 19 March 2003 (19.03.2003), entire document	1-7

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 January 2018	26 January 2018
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer FENG, Zhenchang Telephone No. (86-10) 62084968

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
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