US010562418B2

(12) **United States Patent**
Williams et al.

(10) **Patent No.: US 10,562,418 B2**
(45) **Date of Patent: Feb. 18, 2020**

(54) **LOAD LEG AND CHILD SAFETY SEAT ASSEMBLY THEREWITH**

(71) Applicant: **Wonderland Switzerland AG**, Steinhausen (CH)

(72) Inventors: **Bruce Williams**, Narvon, PA (US); **Gregory Sellers**, Christiana, PA (US)

(73) Assignee: **Wonderland Switzerland AG**, Steinhausen (CH)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 134 days.

(21) Appl. No.: **15/703,994**

(22) Filed: **Sep. 14, 2017**

(65) **Prior Publication Data**

US 2018/0079331 A1 Mar. 22, 2018

Related U.S. Application Data

(60) Provisional application No. 62/395,706, filed on Sep. 16, 2016.

(51) **Int. Cl.**

B60N 2/28	(2006.01)
B60N 2/50	(2006.01)
B60N 2/72	(2006.01)

(52) **U.S. Cl.**

CPC ***B60N 2/2824*** (2013.01); ***B60N 2/2812*** (2013.01); ***B60N 2/2845*** (2013.01);
(Continued)

(58) **Field of Classification Search**

CPC .. B60N 2/2812; B60N 2/2824; B60N 2/2845; B60N 2/2851; B60N 2/2863;
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,186,520	A *	2/1993	Whitaker	B60N 2/2803 24/136 R
5,432,985	A *	7/1995	Bernart	A44B 11/04 24/200

(Continued)

FOREIGN PATENT DOCUMENTS

CN	1346616 A	5/2002
CN	1348887 A	5/2002

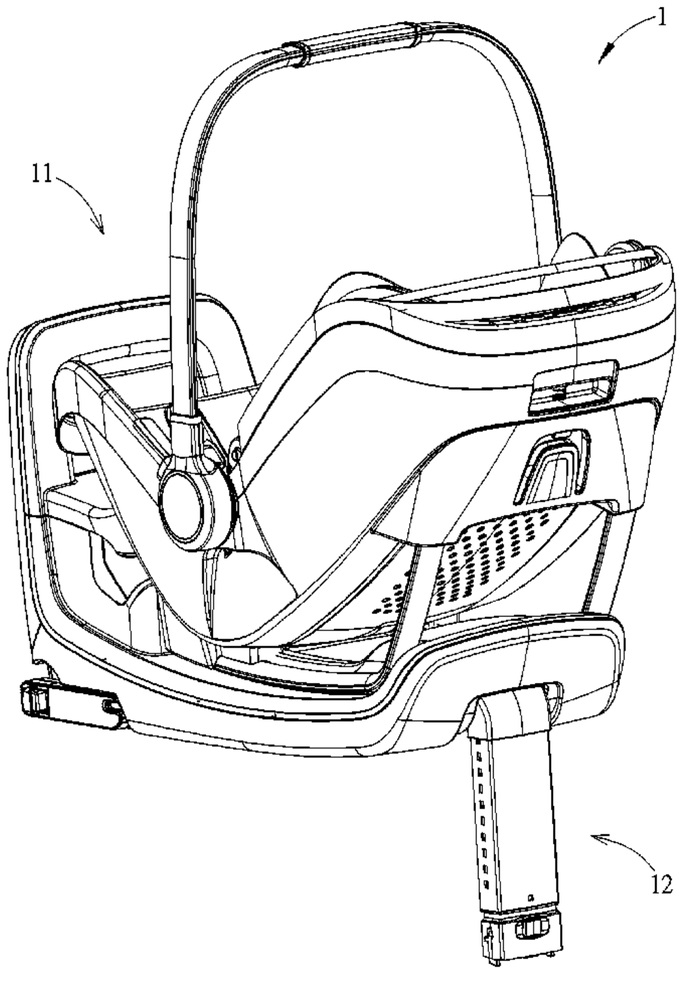
(Continued)

Primary Examiner — James M Ference
(74) *Attorney, Agent, or Firm* — Winston Hsu

(57) **ABSTRACT**

A load leg adapted for a child safety seat includes a first telescoping member, a second telescoping member, a third telescoping member, a first engaging assembly, a second engaging assembly, and an operating member. The first engaging assembly is movably disposed on the first telescoping member for engaging with or disengaging from the second telescoping member. The second engaging assembly is movably disposed on the second telescoping member for engaging with or disengaging from the third telescoping member. The operating member is for driving the first engaging assembly and the second engaging assembly simultaneously to allow relative sliding movement of the first telescoping member and the second telescoping member and relative sliding movement of the second telescoping member and the third telescoping member at the same time, which provides a convenient way to extend the load leg between the child safety seat and a floor of a vehicle.

14 Claims, 8 Drawing Sheets



(52) **U.S. Cl.**
CPC ***B60N 2/2851*** (2013.01); ***B60N 2/2863*** (2013.01); ***B60N 2/2881*** (2013.01); ***B60N 2/505*** (2013.01); ***B60N 2/72*** (2013.01)

(58) **Field of Classification Search**
CPC B60N 2/2881; B60N 2/505; B60N 2/72; B60N 2/26; B60N 2/28; B60N 2/2803
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,487,588	A *	1/1996	Burleigh	B60N 2/2806 297/250.1
5,522,639	A *	6/1996	Jaime	B60N 2/28 297/183.3
5,611,596	A *	3/1997	Barley	B60N 2/2806 297/256.13
5,685,603	A *	11/1997	Lane, Jr.	B60N 2/2821 297/216.11
5,876,011	A *	3/1999	Blasing	F16M 11/28 248/170
6,099,072	A *	8/2000	Sturt	B60N 2/3011 296/65.09
6,152,525	A *	11/2000	Carine	B60N 2/2821 108/9
6,152,528	A *	11/2000	van Montfort	A44B 11/08 297/250.1
6,474,735	B1 *	11/2002	Carnahan	B60N 2/2803 297/250.1
6,508,510	B2 *	1/2003	Yamazaki	B60N 2/2806 297/250.1
6,517,153	B1 *	2/2003	Brewer	A47C 7/66 297/184.1
6,672,664	B2 *	1/2004	Yanaka	B60N 2/2806 24/134 KB
6,676,212	B1 *	1/2004	Amirault	A47C 1/03 297/250.1
6,702,384	B1 *	3/2004	Brown	A47C 3/38 182/204
6,783,135	B1 *	8/2004	Nord	B60N 2/2806 280/30
6,857,700	B2 *	2/2005	Eastman	B60N 2/2806 297/250.1
6,860,557	B2 *	3/2005	Jonasson	B60N 2/26 297/253
6,916,066	B2	7/2005	Sedlack	
6,979,057	B2	12/2005	Sedlack	
7,163,265	B2 *	1/2007	Adachi	B60N 2/2806 297/250.1
7,231,676	B2 *	6/2007	Cloer	A47C 19/024 108/147.19
7,438,358	B2 *	10/2008	Santamaria	A47D 13/02 297/256.1
7,472,955	B2 *	1/2009	Crane	B60N 2/2806 297/250.1
7,495,359	B2 *	2/2009	Klinke	A47B 9/04 310/51
7,549,702	B2 *	6/2009	Meyers	A47K 3/122 297/16.1
7,926,874	B2 *	4/2011	Hendry	B60N 2/2806 297/250.1
7,988,230	B2 *	8/2011	Heisey	B60N 2/2821 297/250.1
8,262,161	B2 *	9/2012	Fritz	B60N 2/2806 297/253
8,322,788	B2 *	12/2012	Williams	B60N 2/2806 297/256.16
8,567,862	B2 *	10/2013	Williams	B60N 2/2806 297/188.13
8,573,695	B2 *	11/2013	Van Geer	B60N 2/2806 297/256.16
8,845,022	B2 *	9/2014	Strong	B60N 2/2824 297/256.16
8,870,285	B2 *	10/2014	Williams	B60N 2/2821 297/256.13
8,973,991	B2 *	3/2015	Wuerstl	B60N 2/2806 297/253
8,973,992	B2 *	3/2015	Guo	B60N 2/2806 24/68 R
8,979,198	B2	3/2015	Williams	
9,156,379	B2 *	10/2015	Williams	B60N 2/2821
9,162,593	B2 *	10/2015	Spence	B60N 2/265
9,174,554	B2 *	11/2015	Maciejczyk	B60N 2/265
9,308,838	B2 *	4/2016	Miller	B60N 2/2821
9,315,124	B2 *	4/2016	Lehman	B60N 2/2806
9,365,135	B2 *	6/2016	Carpenter	B60N 2/2821
9,365,145	B2 *	6/2016	Millasseau	B60N 3/063
9,499,074	B2 *	11/2016	Strong	B60N 2/2806
9,598,025	B1 *	3/2017	Scheppegrell	B60N 2/90
9,937,823	B2 *	4/2018	Williams	B60N 2/2812
9,963,051	B2	5/2018	Strong	
10,023,079	B2 *	7/2018	Zhao	B60N 2/2806
10,035,436	B2 *	7/2018	Zhou	B60N 2/2806
2002/0113470	A1 *	8/2002	Kain	B60N 2/2806 297/256.16
2003/0151286	A1 *	8/2003	Kain	B60N 2/2806 297/256.16
2003/0164632	A1 *	9/2003	Sedlack	A47D 13/02 297/256.16
2004/0041448	A1 *	3/2004	Takizawa	B60N 2/2812 297/216.11
2004/0070244	A1 *	4/2004	Williams	B60N 2/2851 297/250.1
2005/0110318	A1 *	5/2005	Meeker	B60N 2/2812 297/256.16
2005/0168023	A1 *	8/2005	Gangadharan	A47D 13/02 297/250.1
2006/0012234	A1 *	1/2006	Collias	B60N 2/2806 297/423.38
2006/0055218	A1 *	3/2006	Barker	B60N 2/2803 297/250.1
2007/0069562	A1 *	3/2007	Van Montfort	B60N 2/286 297/253
2007/0236053	A1 *	10/2007	West	A47C 16/00 297/4
2008/0030052	A1 *	2/2008	Chen	B60N 2/2824 297/188.02
2008/0277984	A1 *	11/2008	Carine	B60N 2/2806 297/253
2008/0303321	A1 *	12/2008	Powell	B60N 2/2824 297/216.11
2008/0315647	A1 *	12/2008	Carine	B60N 2/2824 297/250.1
2009/0165207	A1 *	7/2009	Reed	A61G 1/013 5/611
2009/0165208	A1 *	7/2009	Reed	A61G 1/052 5/611
2009/0222988	A1 *	9/2009	Reed	A61G 1/0567 5/627
2010/0052384	A1 *	3/2010	Yang	B60N 2/2824 297/253
2010/0133303	A1 *	6/2010	Schilly	A45F 3/10 224/155
2011/0057489	A1 *	3/2011	Greene	B60N 2/2806 297/253
2011/0233374	A1 *	9/2011	Clement	B60N 2/2821 248/542
2011/0254331	A1 *	10/2011	Nagelski	B60N 2/2806 297/216.11
2012/0119457	A1 *	5/2012	Williams	B60N 2/2821 280/30
2013/0015300	A1 *	1/2013	Klinke	A47B 9/20 248/49
2013/0307300	A1 *	11/2013	Pos	B60N 2/2812 297/216.12
2014/0001800	A1 *	1/2014	Mo	B60N 2/2824 297/216.11
2014/0203605	A1 *	7/2014	Cheng	B60N 2/2809 297/250.1

(56) **References Cited**

U.S. PATENT DOCUMENTS

2014/0232152	A1*	8/2014	Minato	B60N 2/2809 297/216.11
2014/0265480	A1*	9/2014	Perrin	B60N 2/26 297/217.4
2014/0265489	A1*	9/2014	Morgenstern	B60N 2/2812 297/256.15
2015/0076878	A1*	3/2015	Santamaria	B60N 2/2824 297/256.13
2015/0091343	A1*	4/2015	Cheng	B60N 2/2821 297/216.11
2016/0200225	A1*	7/2016	Van Der Veer	B60N 2/2812 297/256.16
2016/0278531	A1*	9/2016	Webb	A47C 9/10
2016/0311345	A1*	10/2016	Morgenstern	B60N 2/2806
2016/0318425	A1*	11/2016	Hjerpe	B60N 2/2824
2016/0347210	A1*	12/2016	Mason	B60N 2/2806
2016/0347212	A1*	12/2016	Mason	B60N 2/2806
2017/0240072	A1	8/2017	Wright	
2017/0355287	A1	12/2017	Anderson	
2018/0056822	A1	3/2018	Anderson	

FOREIGN PATENT DOCUMENTS

CN	1382602	A	12/2002
CN	101284501	A	10/2008
CN	101386275	A	3/2009
CN	101508255	A	8/2009
CN	203254992	U	10/2013
CN	103661024	A	3/2014
CN	203864487	U	10/2014
CN	104527469	A	4/2015
CN	204526882	U	8/2015
CN	105329123	A	2/2016
CN	205468637	U	8/2016
CN	205573679	U	9/2016
EP	1 393 967	A1	3/2004
FR	2 928 882	A1	9/2009
JP	2016-7933	A	1/2016

* cited by examiner

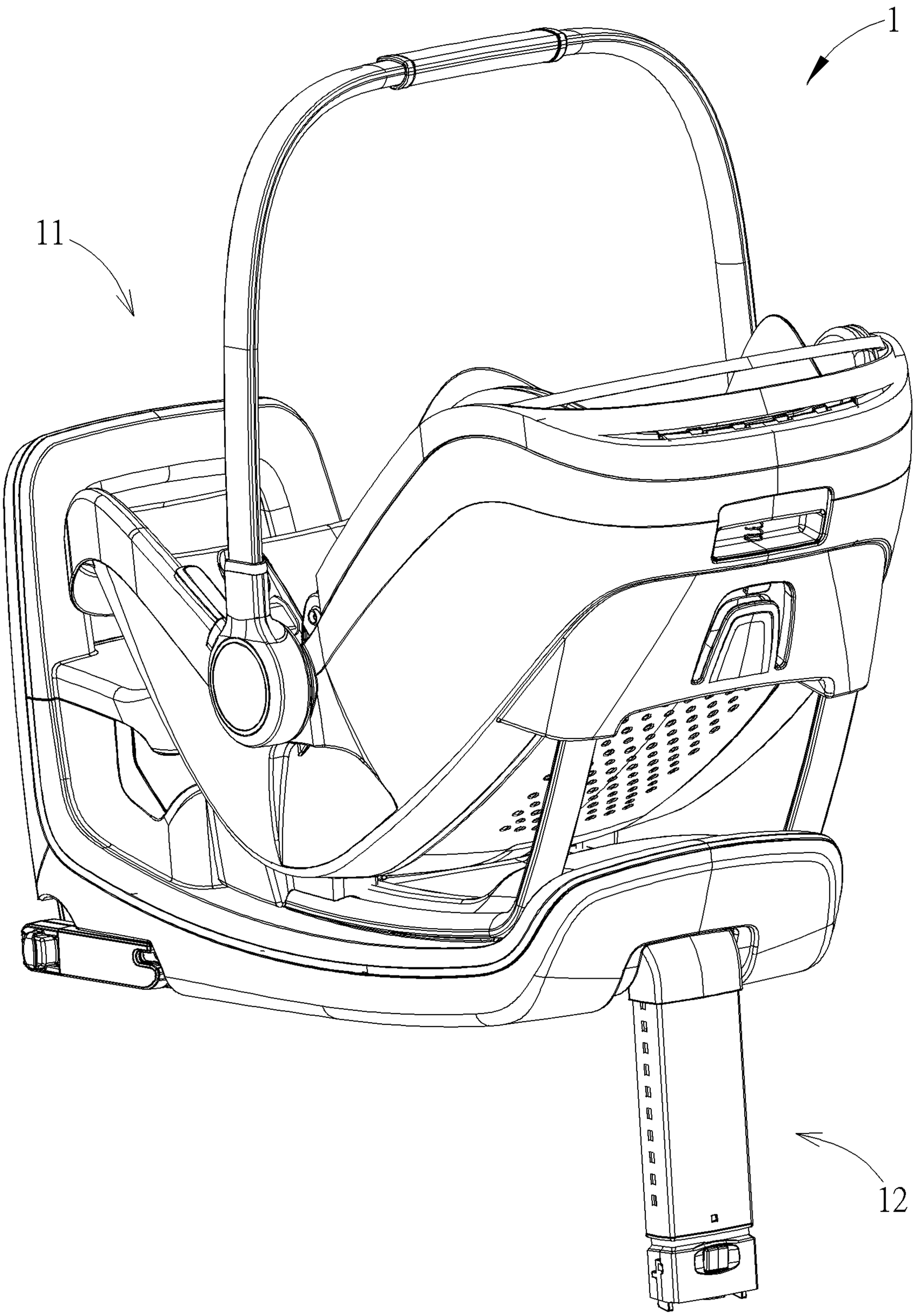


FIG. 1

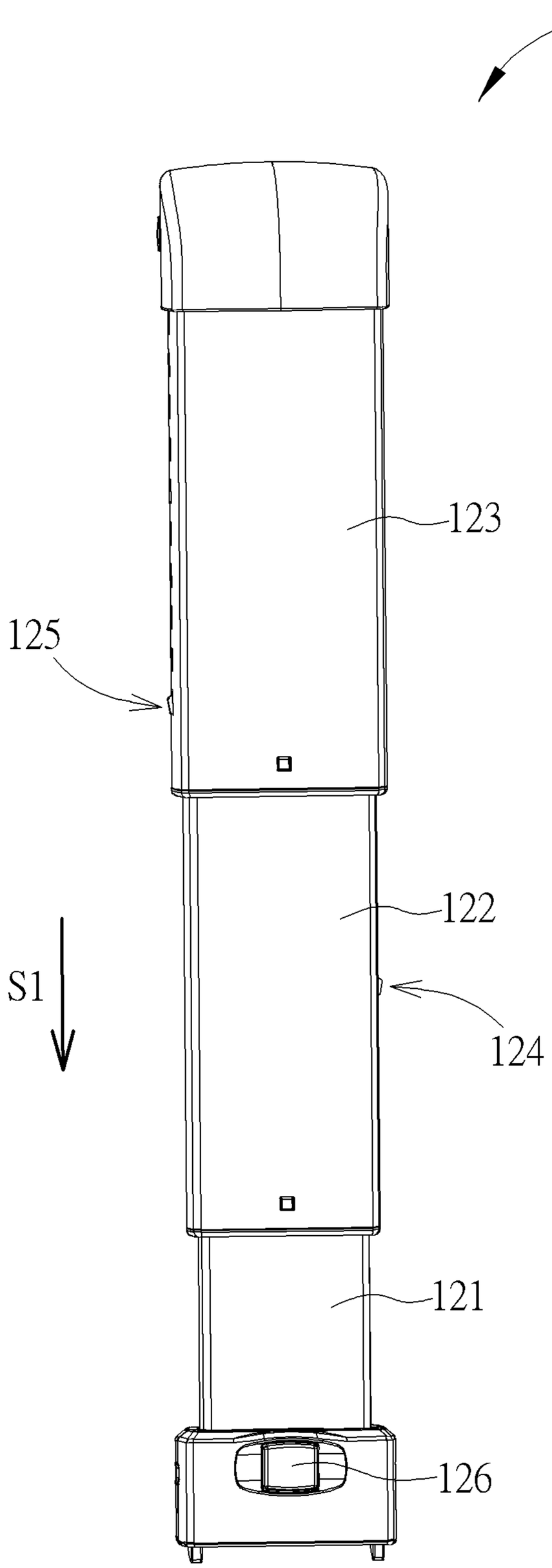


FIG. 2

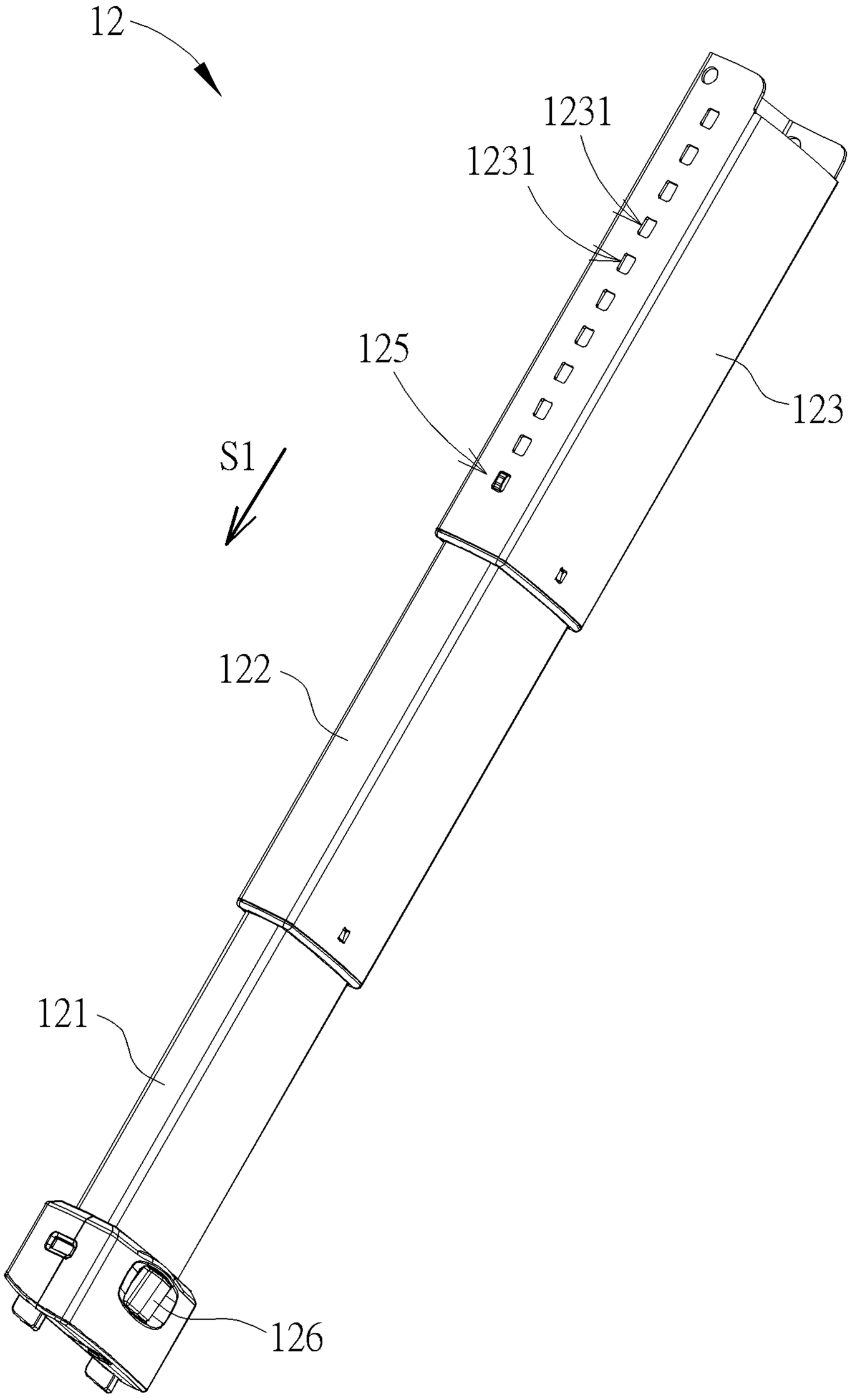


FIG. 3

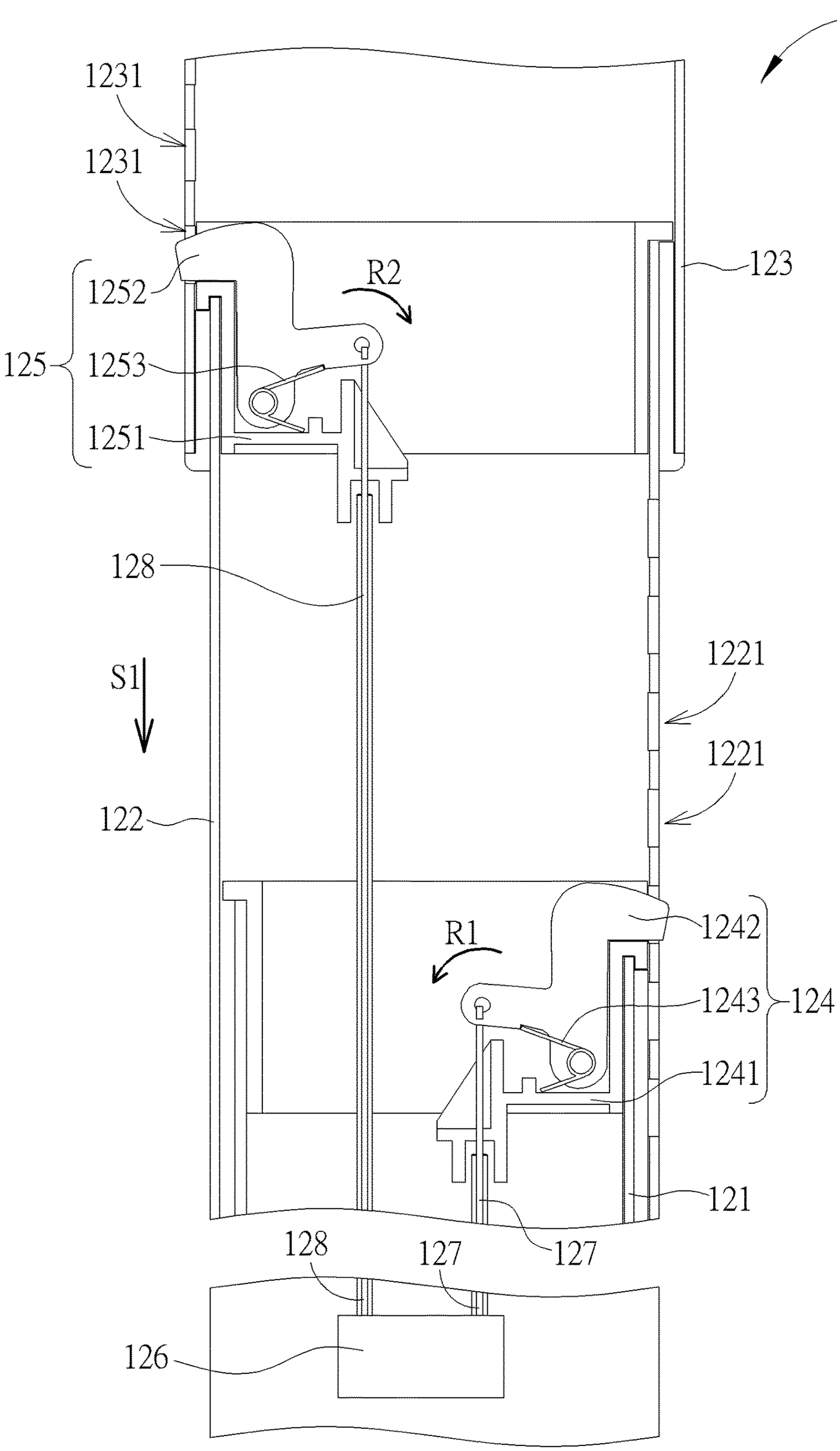

12
1231
1231
123
R2
1252
125
1253
1251
128
S1
1221
1221
122
R1
1242
1243
124
1241
121
127
127
128
126

FIG. 4

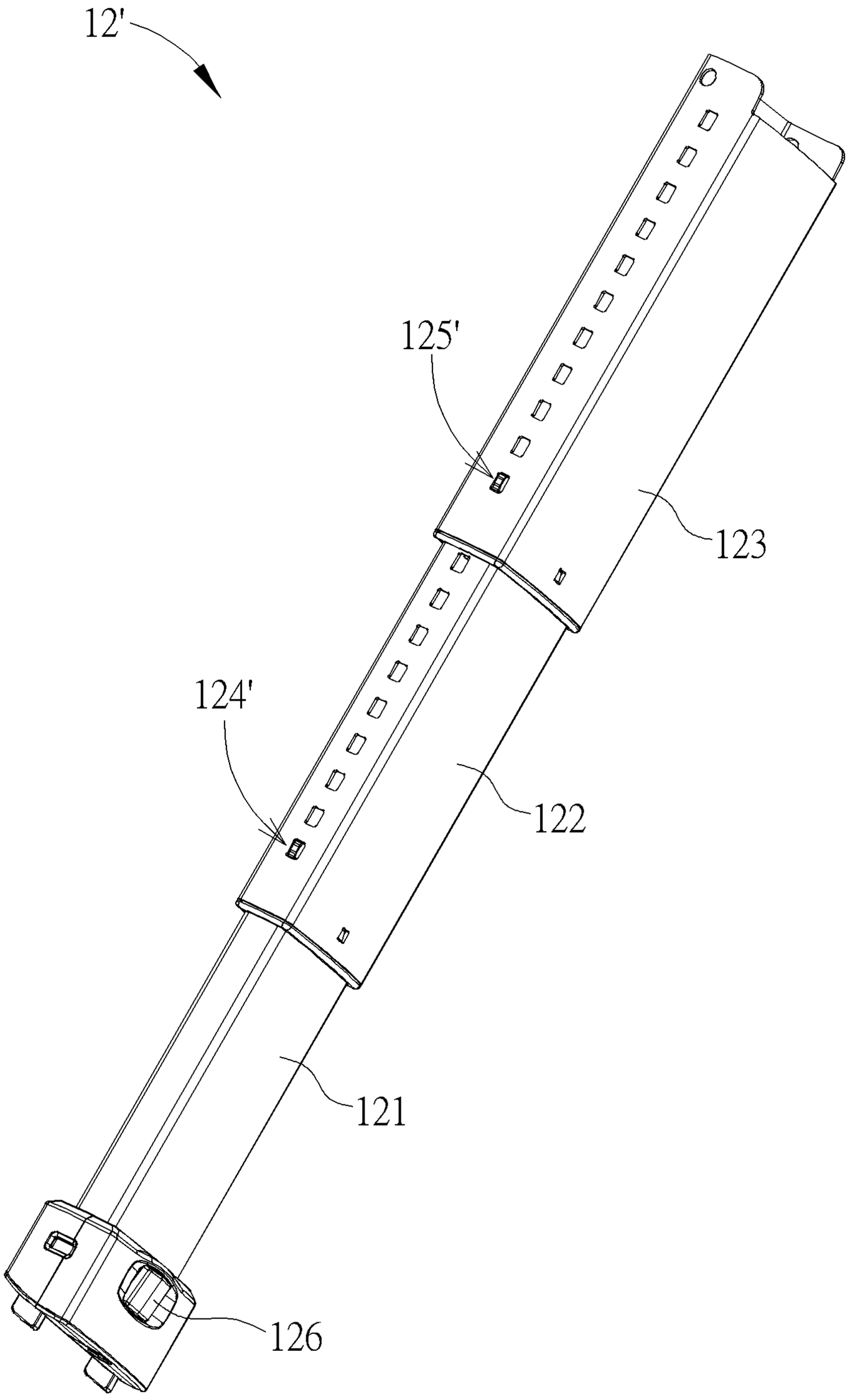


FIG. 5

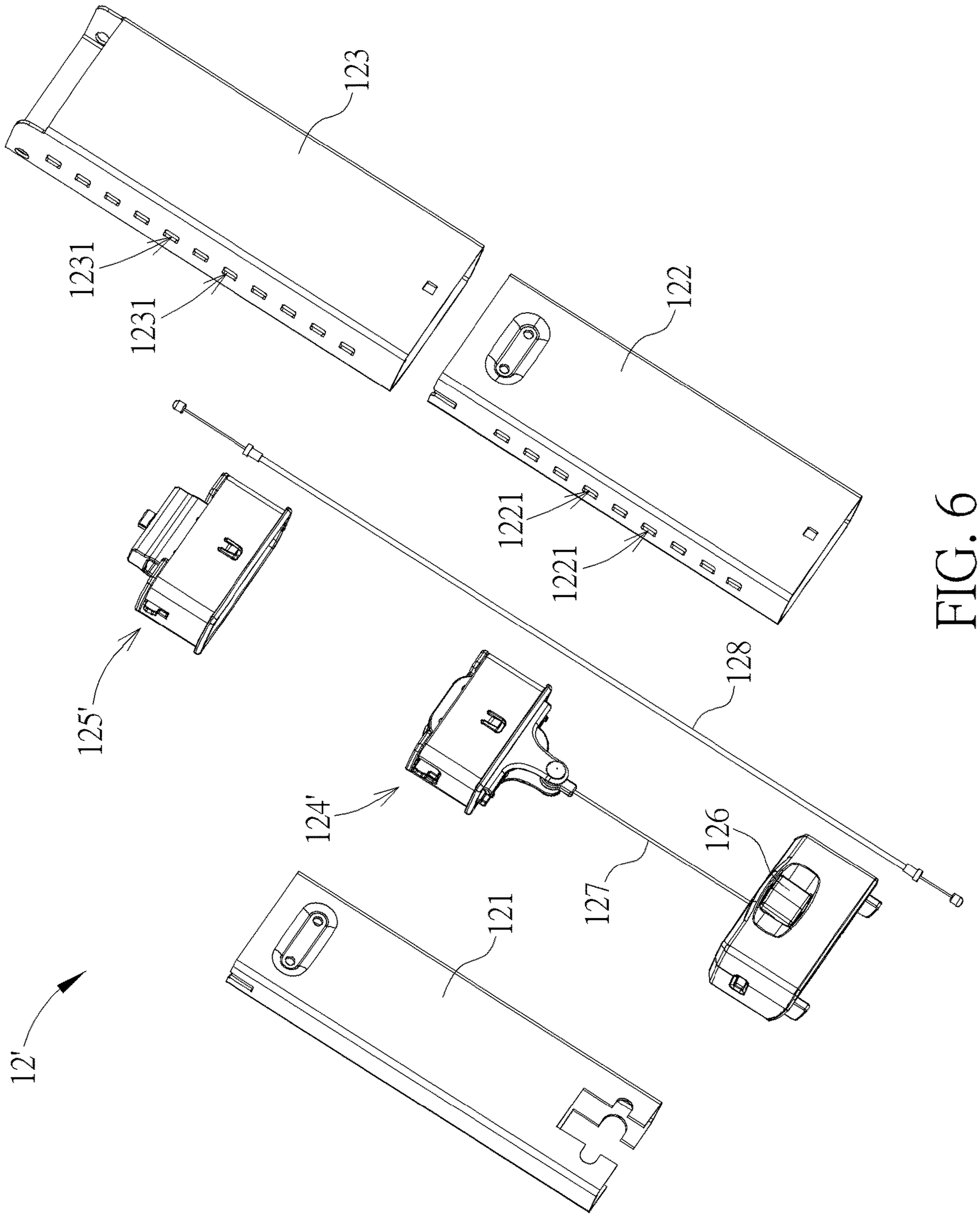


FIG. 6

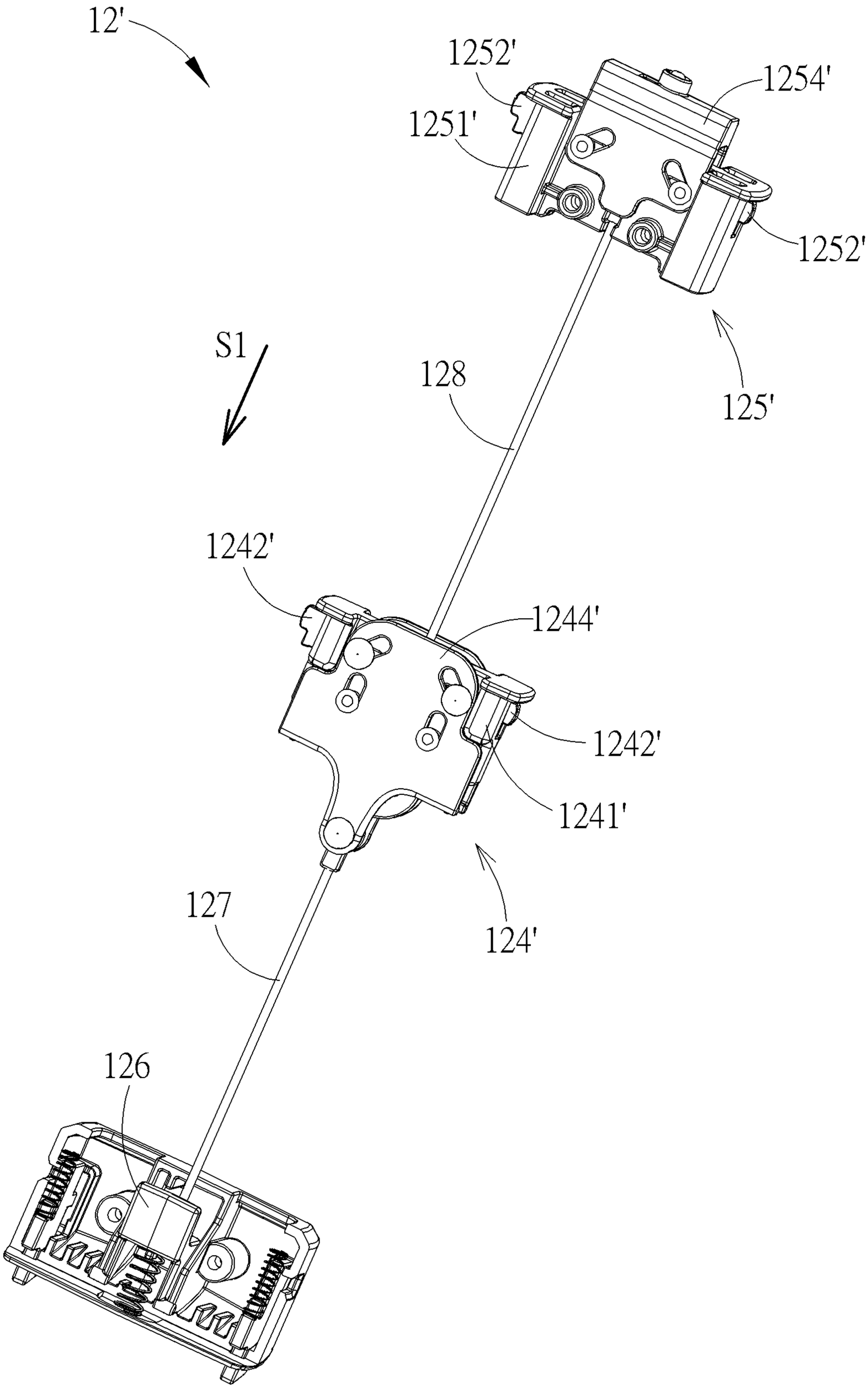

12'
1252'
1254'
1251'
1252'
S1
128
125'
1242'
1244'
1242'
1241'
127
124'
126

FIG. 7

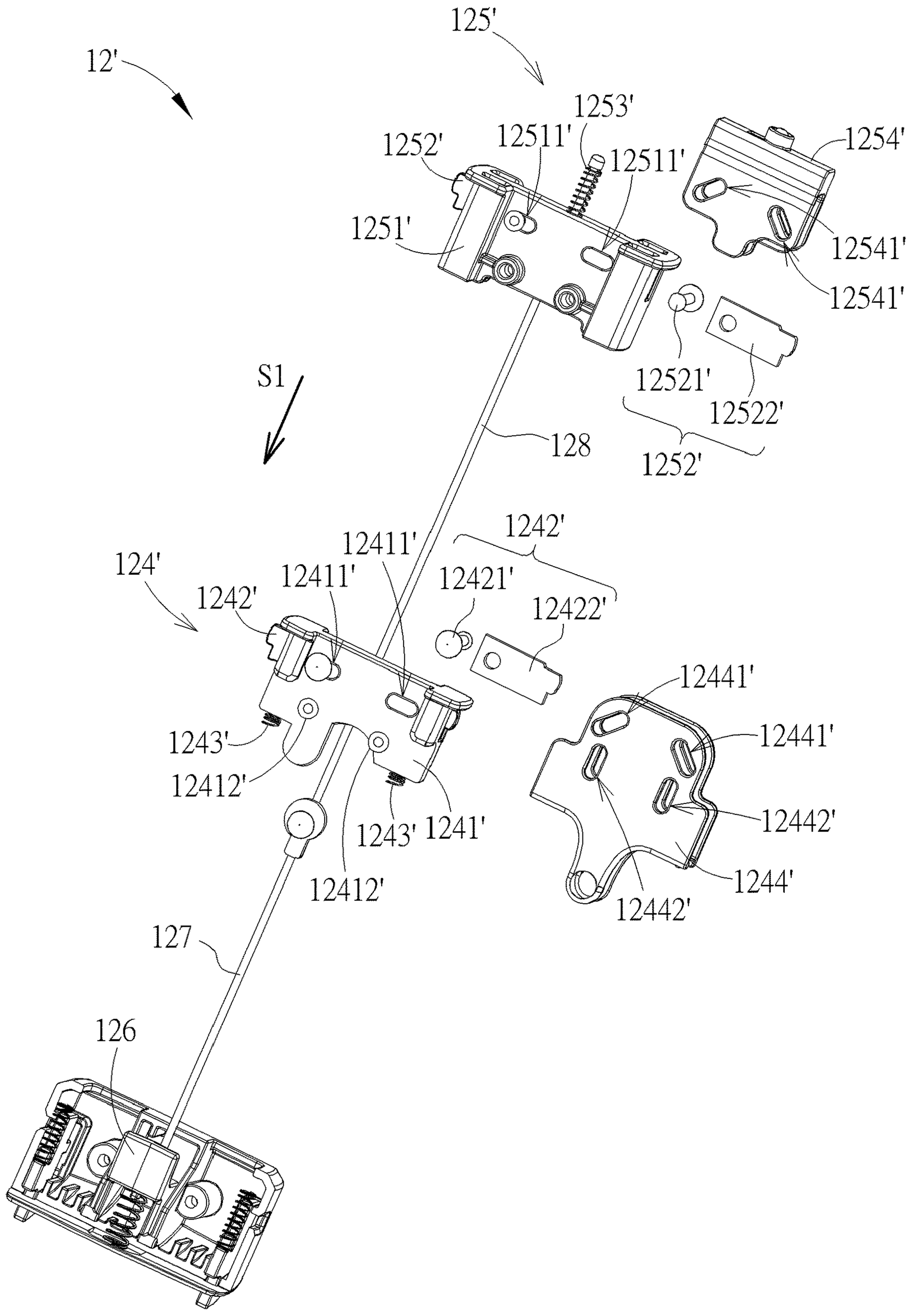

12'
125'
1253'
12511'
12511'
1252'
1254'
1251'
12541'
12541'
12521'
12522'
1252'
128
S1
124'
1242'
12411'
12411'
1242'
12421'
12422'
12441'
12441'
1243'
12412'
1243'
1241'
12442'
1244'
12412'
12442'
127
126

FIG. 8

LOAD LEG AND CHILD SAFETY SEAT ASSEMBLY THEREWITH

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Patent Application No. 62/395,706 filed on Sep. 16, 2016, which is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a children's product, and more particularly, to a load leg which has advantages of wide-range adjustment and easy operation, and a child safety seat assembly therewith.

2. Description of the Prior Art

A child safety seat is specifically designed to protect children from injury or death during collisions. The child safety seat usually can be installed on a vehicle in a forward-facing position or a rear-facing position. In order to prevent the forward moment and rotation of the child safety seat during collisions, a top tether of the child safety seat can be combined with a seat belt of the vehicle when the child safety seat is in the forward-facing position. On the other hands, since the top tether is not effective or available when the child safety seat is in the rear-facing position, a load leg of the child safety seat can extend to a floor of the vehicle for providing support. However, there is a need to design the load leg with an adjustable length to fit with different types of vehicles.

SUMMARY OF THE INVENTION

Therefore, it is an objective of the present invention to provide a load leg which has advantages of wide range adjustment and easy operation, and a child safety seat assembly therewith.

In order to achieve the aforementioned objective, the present invention discloses a load leg adapted for a child safety seat. The load leg includes a first telescoping member, a second telescoping member, a third telescoping member, a first engaging assembly, a second engaging assembly, and an operating member. The first telescoping member is for abutting against a grounding surface. The second telescoping member is slidably disposed on the first telescoping member. The third telescoping member is slidably disposed on the second telescoping member and fixedly connected to the child safety seat. The first engaging assembly is movably disposed on the first telescoping member for engaging with second telescoping member to restrain the first telescoping member and the second telescoping member from sliding relative to each other or disengaging from the second telescoping member to allow the first telescoping member and the second telescoping member to slide relative to each other. The second engaging assembly is movably disposed on the second telescoping member for engaging with third telescoping member to restrain the second telescoping member and the third telescoping member from sliding relative to each other or disengaging from the third telescoping member to allow the second telescoping member and the third telescoping member to slide relative to each other. The operating member is connected to the first engaging assembly and the second engaging assembly for driving the first engaging assembly to disengage from the second telescoping member and for driving the second engaging assembly to disengage from the third telescoping member simultaneously.

According to an embodiment of the present invention, the first engaging assembly and the second engaging assembly are misaligned with each other along a direction substantially perpendicular to sliding directions of the second telescoping member and the third telescoping member.

According to an embodiment of the present invention, the load leg further includes a first linking member and a second linking member. The operating member is connected to the first engaging assembly by the first linking member, and the operating member is connected to the second engaging assembly by the second linking member.

According to an embodiment of the present invention, the first linking member and the second linking member are cables.

According to an embodiment of the present invention, the first engaging assembly includes a first housing and a first engaging pawl. The first housing is fixed on the first telescoping member. The first engaging pawl is pivoted to the first housing and connected to the first linking member. The second engaging assembly includes a second housing and a second engaging pawl. The second housing is fixed on the second telescoping member, and the second engaging pawl is pivoted to the second housing and connected to the second linking member.

According to an embodiment of the present invention, a plurality of first engaging portions is formed on the second telescoping member and along a sliding direction of the second telescoping member. A plurality of second engaging portions is formed on the third telescoping member and along a sliding direction of the third telescoping member. The operating member drives the first engaging pawl to pivotally disengage from one of the plurality of first engaging portions on the second telescoping member and drives the second engaging pawl to pivotally disengage from one of the plurality of second engaging portions on the third telescoping member simultaneously.

According to an embodiment of the present invention, the first engaging assembly and the second engaging assembly are located at two opposite sides, and the plurality of first engaging portions and the plurality of second engaging portions are located at two opposite sides.

According to an embodiment of the present invention, the first engaging assembly further includes a first recovering member abutting against the first engaging pawl for biasing the first engaging pawl to engage with the one of the plurality of first engaging portions formed on the second telescoping member, and the second engaging assembly further includes a second recovering member abutting against the second engaging pawl for biasing the second engaging pawl to engage with the one of the plurality of second engaging portions formed on the third telescoping member.

According to an embodiment of the present invention, the first engaging assembly includes a first housing, a first driving member, and a first engaging pawl. The first housing is fixed on the first telescoping member. The first driving member is connected to the first linking member. A first sliding slot is formed on the first housing. A longitudinal direction of the first sliding slot is substantially perpendicular to a sliding direction of the second telescoping member. A first driving slot is formed on the first driving member. A longitudinal direction of the first driving slot is inclined

relative to the longitudinal direction of the first sliding slot, and the first engaging pawl includes a first protruding column passing through the first driving slot and the first sliding slot and a first pawl portion connected to the first protruding column.

According to an embodiment of the present invention, the second engaging assembly includes a second housing, a second driving member, and a second engaging pawl. The second housing is fixed on the second telescoping member. The second driving member is connected to the second linking member. A second sliding slot is formed on the second housing. A longitudinal direction of the second sliding slot is substantially perpendicular to a sliding direction of the third telescoping member. A second driving slot is formed on the second driving member. A longitudinal direction of the second driving slot is inclined relative to the longitudinal direction of the second sliding slot, and the second engaging pawl includes a second protruding column passing through the second driving slot and the second sliding slot and a second pawl portion connected to the second protruding column.

According to an embodiment of the present invention, a plurality of first engaging portions is formed on the second telescoping member and along a sliding direction of the second telescoping member. A plurality of second engaging portions is formed on the third telescoping member and along a sliding direction of the third telescoping member. The operating member drives the first engaging pawl to pivotally disengage from one of the plurality of first engaging portions on the second telescoping member and drives the second engaging pawl to pivotally disengage from one of the plurality of second engaging portions on the third telescoping member simultaneously.

According to an embodiment of the present invention, the first engaging assembly further includes a first recovering member connected between the first housing and the first driving member, and the second engaging assembly further includes a second recovering member connected between the second housing and the second driving member.

According to an embodiment of the present invention, the operating member is disposed on the first telescoping member.

In order to achieve the aforementioned objective, the present invention further discloses a child safety seat assembly. The child safety seat assembly includes a child safety seat and a load leg for supporting the child safety seat. The load leg includes a first telescoping member, a second telescoping member, a third telescoping member, a first engaging assembly, a second engaging assembly, and an operating member. The first telescoping member is for abutting against a grounding surface. The second telescoping member is slidably disposed on the first telescoping member. The third telescoping member is slidably disposed on the second telescoping member and fixedly connected to the child safety seat. The first engaging assembly is movably disposed on the first telescoping member for engaging with second telescoping member to restrain the first telescoping member and the second telescoping member from sliding relative to each other or disengaging from the second telescoping member to allow the first telescoping member and the second telescoping member to slide relative to each other. The second engaging assembly is movably disposed on the second telescoping member for engaging with third telescoping member to restrain the second telescoping member and the third telescoping member from sliding relative to each other or disengaging from the third telescoping member to allow the second telescoping member and the third telescoping member to slide relative to each other. The operating member is connected to the first engaging assembly and the second engaging assembly for driving the first engaging assembly to disengage from the second telescoping member and for driving the second engaging assembly to disengage from the third telescoping member simultaneously.

In summary, the present invention utilizes the operating member, the first linking member, and the second linking member for driving the first engaging assembly and the second engaging assembly simultaneously, so that relative sliding movement of the first telescoping member and the second telescoping member and relative sliding movement of the second telescoping member and the third telescoping member are allowed at the same time, which provides a convenient way to adjust an overall length of the load leg. Furthermore, the overall length of the load leg can be extended or shortened by sliding the first telescoping member, the second telescoping member, and the third telescoping member, which provides wide-range adjustment. Hence, the load leg of the child safety seat assembly of the present invention can be suitable for various kinds of vehicles.

These and other objectives of the present invention will no doubt become obvious to those of ordinary skill in the art after reading the following detailed description of the preferred embodiment that is illustrated in the various figures and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram of a child safety seat assembly according to a first embodiment of the present invention.

FIG. **2** and FIG. **3** are diagrams of a load leg at different views according to the first embodiment of the present invention.

FIG. **4** is a partial enlarged internal structural diagram of the load leg according to the first embodiment of the present invention.

FIG. **5** is a schematic diagram of a load leg according to a second embodiment of the present invention.

FIG. **6** is an exploded diagram of the load leg according to the second embodiment of the present invention.

FIG. **7** is a partial internal structural diagram of the load leg according to the second embodiment of the present invention.

FIG. **8** is a partial exploded diagram of the load leg shown in FIG. **7** according to the second embodiment of the present invention.

DETAILED DESCRIPTION

In the following detailed description of the preferred embodiments, reference is made to the accompanying drawings which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. In this regard, directional terminology, such as "top," "bottom," "front," "back," etc., is used with reference to the orientation of the Figure (s) being described. The components of the present invention can be positioned in a number of different orientations. As such, the directional terminology is used for purposes of illustration and is in no way limiting. Accordingly, the drawings and descriptions will be regarded as illustrative in nature and not as restrictive.

Please refer to FIG. **1** to FIG. **4**. FIG. **1** is a schematic diagram of a child safety seat assembly **1** according to a first

embodiment of the present invention. FIG. **2** and FIG. **3** are diagrams of a load leg **12** at different views according to the first embodiment of the present invention. FIG. **4** is a partial enlarged internal structural diagram of the load leg **12** according to the first embodiment of the present invention. As shown in FIG. **1** to FIG. **4**, the child safety seat assembly **1** includes a child safety seat **11** and the load leg **12**. The load leg **12** can extend to a floor of a vehicle, which is not shown in figures, so as to support the child safety seat **11** for preventing forward movement and rotation of the child safety seat **11** when the child safety seat **11** is installed on the vehicle in a rear-facing position. The load leg **12** includes a first telescoping member **121**, a second telescoping member **122**, a third telescoping member **123**, a first engaging assembly **124**, a second engaging assembly **125**, an operating member **126**, a first linking member **127**, and a second linking member **128**. The first telescoping member **121** is for abutting against a grounding surface or the floor of the vehicle. The second telescoping member **122** is slidably disposed on the first telescoping member **121**. The third telescoping member **123** is slidably disposed on the second telescoping member **122** and fixedly connected to the child safety seat **11**. An overall length of the load leg **12** can be extended or shortened according to a distance between the child safety seat **11** and the floor of the vehicle by relative sliding movement of the first telescoping member **121** and the second telescoping member **122** and/or relative sliding movement of the second telescoping member **122** and the third telescoping member **123**.

As shown in FIG. **2** to FIG. **4**, the first engaging assembly **124** is movably disposed on the first telescoping member **121** for engaging with the second telescoping member **122** to restrain the first telescoping member **121** and the second telescoping member **122** from sliding relative to each other. On the other hand, the first engaging assembly **124** can be disengaged from the second telescoping member **122** to allow the first telescoping member **121** and the second telescoping member **122** to slide relative to each other. The second engaging assembly **125** is movably disposed on the second telescoping member **122** for engaging with the third telescoping member **123** to restrain the second telescoping member **122** and the third telescoping member **123** from sliding relative to each other. On the other hand, the second engaging assembly **125** can be disengaged from the third telescoping member **123** to allow the second telescoping member **122** and the third telescoping member **123** to slide relative to each other. The operating member **126** is connected to the first engaging assembly **124** by the first linking member **127** and connected to the second engaging assembly **125** by the second linking member **128**, so that the operating member **126** can drive the first engaging assembly **124** to disengage from the second telescoping member **122** by the first linking member **127** and drive the second engaging assembly **125** to disengage from the third telescoping member **123** by the second linking member **128**, simultaneously.

Specifically, in this embodiment, a plurality of first engaging portions **1221** is formed on the second telescoping member **122** and along a sliding direction of the second telescoping member **122**. A plurality of second engaging portions **1231** is formed on the third telescoping member **123** and along a sliding direction of the third telescoping member **123**. The first engaging assembly **124** includes a first housing **1241**, a first engaging pawl **1242**, and a first recovering member **1243**. The first housing **1241** is fixed on the first telescoping member **121**. The first engaging pawl **1242** is pivoted to the first housing **1241** and connected to the first linking member **127**. The first recovering member **1243** abuts against the first engaging pawl **1242** for biasing the first engaging pawl **1242** to engage with one of the plurality of first engaging portions **1221** formed on the second telescoping member **122**. Similarly, the second engaging assembly **125** includes a second housing **1251**, a second engaging pawl **1252**, and a second recovering member **1253**. The second housing **1251** is fixed on the second telescoping member **122**. The second engaging pawl **1252** is pivoted to the second housing **1251** and connected to the second linking member **128**. The second recovering member **1253** abuts against the second engaging pawl **1252** for biasing the second engaging pawl **1252** to engage with one of the plurality of second engaging portions **1231** formed on the third telescoping member **123**.

In this embodiment, the first linking member **127** and the second linking member **128** can be preferably two independent cables, and the first recovering member **1243** and the second recovering member **1253** can be preferably torsional springs sheathed on pivoting shafts of the first engaging pawl **1242** and the second engaging pawl **1252** respectively. However, it is not limited thereto. It depends on practical demands. Furthermore, the first engaging assembly **124** and the second engaging assembly **125** can be preferably located at two opposite sides, and the plurality of first engaging portions **1221** and the plurality of second engaging portions **1231** can be preferably located at two opposite sides and in positions corresponding to the first engaging pawl **1242** and the second engaging pawl **1252** respectively. However, it is not limited thereto. In another embodiment, the first engaging assembly **124** and the second engaging assembly **125** also can be located at the same side, and the plurality of first engaging portions **1221** and the plurality of second engaging portions **1231** also can be located at the same side and in positions corresponding to the first engaging pawl **1242** and the second engaging pawl **1252** respectively.

Operational principle of the load leg **12** is described as follows. As shown in FIG. **1** to FIG. **4**, when it is desired to adjust the overall length of the load leg **12** according to the distance between the child safety seat **11** and the floor of the vehicle, the operating member **126** can be pressed to pull the first linking member **127** and the second linking member **128** along a first direction S**1** simultaneously. In such a way, the first engaging pawl **1242** is driven to pivot along a first pivoting direction R**1** to disengage from one of the plurality of first engaging portions **1221** on the second telescoping member **122** and to compress the first recovering member **1243** by the first linking member **127**, and the second engaging pawl **1252** is driven to pivot along a second pivoting direction R**2** opposite to the first pivoting direction R**1** to disengage from one of the plurality of second engaging portions **1231** on the third telescoping member **123** and to compress the second recovering member **1253** by the second linking member **128**. At this moment, the first telescoping member **121** and the second telescoping member **122** are allowed to slide relative to each other due to disengagement of the first engaging pawl **1242** and the one of the plurality of first engaging portions **1221**, and the second telescoping member **122** and the third telescoping member **123** are allowed to slide relative to each other due to disengagement of the second engaging pawl **1252** and the one of the plurality of second engaging portions **1231**. Therefore, the overall length of the load leg **12** can be extended or shortened easily by the relative sliding movement of the first telescoping member **121** and the second

telescoping member **122** and/or the relative sliding movement of the second telescoping member **122** and the third telescoping member **123**.

After adjustment of the first telescoping member **121**, the second telescoping member **122** and the third telescoping member **123**, the operating member **126** can be released, so that the compressed first recovering member **1243** and the compressed second recovering member can drive the first engaging pawl **1242** and the second engaging pawl **1252** to engage with another one of the plurality of first engaging portions **1221** and another one of the plurality of second engaging portions **1231** respectively. At this moment, the first telescoping member **121** and the second telescoping member **122** are restrained from sliding relative to each other due to engagement of the first engaging pawl **1242** and the another one of the plurality of first engaging portions **1221**, and the second telescoping member **122** and the third telescoping member **123** are restrained from sliding relative to each other due to engagement of the second engaging pawl **1252** and the another one of the plurality of second engaging portions **1231**. Therefore, the overall length of the load leg **12** is fixed.

Please refer to FIG. **5** to FIG. **8**. FIG. **5** is a schematic diagram of a load leg **12'** according to a second embodiment of the present invention. FIG. **6** is an exploded diagram of the load leg **12'** according to the second embodiment of the present invention. FIG. **7** is a partial internal structural diagram of the load leg **12'** according to the second embodiment of the present invention. FIG. **8** is a partial exploded diagram of the load leg **12'** shown in FIG. **7** according to the second embodiment of the present invention. As shown in FIG. **5** to FIG. **8**, different from the load leg **12** of the first embodiment, a first engaging assembly **124'** of the load leg **12'** of the second embodiment includes a first housing **1241'**, two first engaging pawls **1242'**, two first recovering members **1243'**, and a first driving member **1244'**. The first housing **1241'** is fixed on the first telescoping member **121**. The two first engaging pawls **1242'** are disposed on the first housing **1241'** and slidable relative to the first housing **1241'** along a direction substantially perpendicular to the sliding direction of the second telescoping member **122**. The first driving member **1244'** is connected to the first linking member **127** and slidable relative to the first housing **1241'** along the sliding direction of the second telescoping member **122** for driving the two first engaging pawls **1242'**. The plurality of the first engaging portions **1221** are formed on two sides of the second telescoping member **122** and located in positions corresponding to the two first engaging pawls **1242'**.

Specifically, two first sliding slots **12411'** are formed on the first housing **1241'**. A longitudinal direction of each of the two first sliding slots **12411'** is substantially perpendicular to the sliding direction of the second telescoping member **122**. Two first driving slots **12441'** are formed on the first driving member **1244'**. A longitudinal direction of each of the two first driving slots **12441'** is inclined relative to the longitudinal direction of the first sliding slot **12411'**, and the two first driving slots **12441'** are not parallel with each other and can be substantially arranged in a V shape. Each of the two first engaging pawls **1242'** includes a first protruding column **12421'** and a first pawl portion **12422'**. Each of the two first pawl portions **12422'** is connected to the corresponding first protruding column **12421'** and for selectively engaging with one of the plurality of first engaging portions **1221** on the second telescoping member **122**. Each of the two first protruding columns **12421'** passes through the corresponding first driving slot **12441'** and the corresponding first sliding slot **12411'**. The two first recovering members **1243'** are connected between the first housing **1241'** and the first driving member **1244'** for biasing the first driving member **1244'** to recover.

Similarly, a second engaging assembly **125'** of the load leg **12'** of the second embodiment includes a second housing **1251'**, two second engaging pawls **1252'**, a second recovering member **1253'**, and a second driving member **1254'**. The second housing **1251'** is fixed on the second telescoping member **122**. The two second engaging pawls **1252'** are disposed on the second housing **1251'** and slidable relative to the second housing **1241'** along a direction substantially perpendicular to the sliding direction of the third telescoping member **123**. The second driving member **1254'** is connected to the second linking member **128** and slidable relative to the second housing **1251'** along the sliding direction of the third telescoping member **123** for driving the two second engaging pawls **1252'**. The plurality of the second engaging portions **1231** are formed on two sides of the third telescoping member **123** and located in positions corresponding to the two second engaging pawls **1252'**.

Specifically, two second sliding slots **12511'** are formed on the second housing **1251'** A longitudinal direction of each of the two second sliding slots **12511'** is substantially perpendicular to the sliding direction of the third telescoping member **123**. Two second driving slots **12541'** are formed on the second driving member **1254'**. A longitudinal direction of each of the two second driving slots **12541'** is inclined relative to the longitudinal direction of the second sliding slot **12511'**, and the two second driving slots **12541'** are not parallel with each other and can be substantially arranged in a V shape. Each of the second engaging pawls **1252'** includes a second protruding column **12521'** and a second pawl portion **12522'**, Each of the two second pawl portions **12522'** is connected to the corresponding second protruding column **12521'** and for selectively engaging with one of the plurality of second engaging portions **1231** on the third telescoping member **123**. Each of the two second protruding columns **12521'** passes through the corresponding second driving slot **12541'** and the corresponding second sliding slot **12511'**. The second recovering member **1253'** is connected between the second housing **1251'** and the second driving member **1254'**. However, the configurations of the first engaging assembly **124'** and the second engaging assembly **125'** are not limited to this embodiment. In another embodiment, the first engaging assembly **124'** can include only one first engaging pawl **1242'**, and the second engaging assembly **125'** can include only one second engaging pawl **1252'**. It depends on practical demands.

Preferably, in this embodiment, two guiding slots **12442'** are formed on the first driving member **1244'** and arranged along the first direction S**1**, and the first housing **1241'** includes two guiding pins **12412'**. By cooperation of the two guiding slots **12442'** and the two guiding pins **12412'**, the first driving member **1244'** can be guided to move relative to the first housing **1241'** along the first direction S**1**.

As shown in FIG. **5** to FIG. **8**, when it is desired to adjust the overall length of the load leg **12'**, the operating member **126** can be pressed to drive the first driving member **1244'** and the second driving member **1254'** to move along the first direction S**1** simultaneously by pulling the first linking member **127** and the second linking member **128** along the first direction S**1** respectively. When the first driving member **1244'** is moved along the first direction S**1**, the first protruding columns **12421'** are driven to move inwardly and close to each other along the first sliding slots **12411'** by oblique and inward movement of the first protruding col-

umns **12421'** along the oblique first driving slots **12441'**. Similarly, when the second driving member **1254'** is moved along the first direction S**1**, the second protruding columns **12521'** are driven to move inwardly and close to each other along the second sliding slots **12511'** by oblique and inward movement of the second protruding columns **12521'** along the oblique second driving slots **12541'**. In such a way, the first driving member **1244'** drives the two first pawl portions **12422'** to disengage from the corresponding first engaging portions **1221** by cooperation of the first protruding columns **12421'**, the first sliding slots **12411'**, and the first driving slots **12441'**, and the second driving member **1254'** drives the two second pawl portions **12522'** to disengage from the corresponding second engaging portions **1231** by cooperation of the second protruding columns **12521'**, the second sliding slots **12511'**, and the second driving slots **12541'**.

At this moment, the first telescoping member **121** and the second telescoping member **122** are allowed to slide relative to each other due to disengagement of the two first pawl portions **12422'** and the corresponding first engaging portions **1221**, and the second telescoping member **122** and the third telescoping member **123** are allowed to slide relative to each other due to disengagement of the second pawl portions **12522'** and the corresponding second engaging portions **1231**, which is convenient for a user to adjust the overall length of the load leg **12'**.

When it is desired to fix the overall length of the load leg **12'** after adjustment of the first telescoping member **121**, the second telescoping member **122** and the third telescoping member **123**, the operating member **126** can be released, so that the extended first recovering member **1243'** and the compressed second recovering member **1253'** can recover the first driving member **1244'** and the second driving member **1254'** to drive the first pawl portions **12422'** and the second pawl portions **12522'** to engage with the corresponding first engaging portions **1221** and the corresponding second engaging portions **1231** respectively. Therefore, the overall length of the load leg **12** is fixed.

In contrast to the prior art, the present invention utilizes the operating member, the first linking member, and the second linking member for driving the first engaging assembly and the second engaging assembly simultaneously, so that the relative sliding movement of the first telescoping member and the second telescoping member and the relative sliding movement of the second telescoping member and the third telescoping member are allowed at the same time, which provides a convenient way to adjust the overall length of the load leg. Furthermore, the overall length of the load leg can be extended or shortened by sliding the first telescoping member, the second telescoping member, and the third telescoping member, which provides wide-range adjustment. Hence, the load leg of the child safety seat assembly of the present invention can be suitable for various kinds of vehicles.

Those skilled in the art will readily observe that numerous modifications and alterations of the device and method may be made while retaining the teachings of the invention. Accordingly, the above disclosure should be construed as limited only by the metes and bounds of the appended claims.

What is claimed is:

1. A load leg adapted for a child safety seat, the load leg comprising:

a first telescoping member for abutting against a grounding surface;

a second telescoping member slidably disposed on the first telescoping member;

a third telescoping member slidably disposed on the second telescoping member and fixedly connected to the child safety seat;

a first engaging assembly movably disposed on the first telescoping member for engaging with second telescoping member to restrain the first telescoping member and the second telescoping member from sliding relative to each other or disengaging from the second telescoping member to allow the first telescoping member and the second telescoping member to slide relative to each other;

a second engaging assembly movably disposed on the second telescoping member for engaging with third telescoping member to restrain the second telescoping member and the third telescoping member from sliding relative to each other or disengaging from the third telescoping member to allow the second telescoping member and the third telescoping member to slide relative to each other; and

an operating member connected to the first engaging assembly and the second engaging assembly for driving the first engaging assembly to disengage from the second telescoping member and for driving the second engaging assembly to disengage from the third telescoping member simultaneously.

2. The load leg of claim **1**, wherein the first engaging assembly and the second engaging assembly are misaligned with each other along a direction substantially perpendicular to sliding directions of the second telescoping member and the third telescoping member.

3. The load leg of claim **1**, further comprising a first linking member and a second linking member, the operating member being connected to the first engaging assembly by the first linking member, and the operating member being connected to the second engaging assembly by the second linking member.

4. The load leg of claim **3**, wherein the first linking member and the second linking member are cables.

5. The load leg of claim **3**, wherein the first engaging assembly comprises a first housing and a first engaging pawl, the first housing is fixed on the first telescoping member, the first engaging pawl is pivoted to the first housing and connected to the first linking member, the second engaging assembly comprises a second housing and a second engaging pawl, the second housing is fixed on the second telescoping member, and the second engaging pawl is pivoted to the second housing and connected to the second linking member.

6. The load leg of claim **5**, wherein a plurality of first engaging portions is formed on the second telescoping member and along a sliding direction of the second telescoping member, a plurality of second engaging portions is formed on the third telescoping member and along a sliding direction of the third telescoping member, the operating member drives the first engaging pawl to pivotally disengage from one of the plurality of first engaging portions on the second telescoping member and drives the second engaging pawl to pivotally disengage from one of the plurality of second engaging portions on the third telescoping member simultaneously.

7. The load leg of claim **6**, wherein the first engaging assembly and the second engaging assembly are located at two opposite sides, and the plurality of first engaging portions and the plurality of second engaging portions are located at two opposite sides.

8. The load leg of claim **7**, wherein the first engaging assembly further comprises a first recovering member abut-

ting against the first engaging pawl for biasing the first engaging pawl to engage with the one of the plurality of first engaging portions formed on the second telescoping member, and the second engaging assembly further comprises a second recovering member abutting against the second engaging pawl for biasing the second engaging pawl to engage with the one of the plurality of second engaging portions formed on the third telescoping member.

9. The load leg of claim **3**, wherein the first engaging assembly comprises a first housing, a first driving member, and a first engaging pawl, the first housing is fixed on the first telescoping member, the first driving member is connected to the first linking member, a first sliding slot is formed on the first housing, a longitudinal direction of the first sliding slot is substantially perpendicular to a sliding direction of the second telescoping member, a first driving slot is formed on the first driving member, a longitudinal direction of the first driving slot is inclined relative to the longitudinal direction of the first sliding slot, and the first engaging pawl comprises a first protruding column passing through the first driving slot and the first sliding slot and a first pawl portion connected to the first protruding column.

10. The load leg of claim **9**, wherein the second engaging assembly comprises a second housing, a second driving member, and a second engaging pawl, the second housing is fixed on the second telescoping member, the second driving member is connected to the second linking member, a second sliding slot is formed on the second housing, a longitudinal direction of the second sliding slot is substantially perpendicular to a sliding direction of the third telescoping member, a second driving slot is formed on the second driving member, a longitudinal direction of the second driving slot is inclined relative to the longitudinal direction of the second sliding slot, and the second engaging pawl comprises a second protruding column passing through the second driving slot and the second sliding slot and a second pawl portion connected to the second protruding column.

11. The load leg of claim **10**, wherein a plurality of first engaging portions is formed on the second telescoping member and along a sliding direction of the second telescoping member, a plurality of second engaging portions is formed on the third telescoping member and along a sliding direction of the third telescoping member, the operating member drives the first engaging pawl to pivotally disengage from one of the plurality of first engaging portions on the second telescoping member and drives the second engaging pawl to pivotally disengage from one of the plurality of second engaging portions on the third telescoping member simultaneously.

12. The load leg of claim **11**, wherein the first engaging assembly further comprises a first recovering member connected between the first housing and the first driving member, and the second engaging assembly further comprises a second recovering member connected between the second housing and the second driving member.

13. The load leg of claim **1**, wherein the operating member is disposed on the first telescoping member.

14. A child safety seat assembly comprising:

a child safety seat; and

a load leg for supporting the child safety seat, the load leg comprising:

a first telescoping member for abutting against a grounding surface;

a second telescoping member slidably disposed on the first telescoping member;

a third telescoping member slidably disposed on the second telescoping member and fixedly connected to the child safety seat;

a first engaging assembly movably disposed on the first telescoping member for engaging with second telescoping member to restrain the first telescoping member and the second telescoping member from sliding relative to each other or disengaging from the second telescoping member to allow the first telescoping member and the second telescoping member to slide relative to each other;

a second engaging assembly movably disposed on the second telescoping member for engaging with third telescoping member to restrain the second telescoping member and the third telescoping member from sliding relative to each other or disengaging from the third telescoping member to allow the second telescoping member and the third telescoping member to slide relative to each other; and

an operating member connected to the first engaging assembly and the second engaging assembly for driving the first engaging assembly to disengage from the second telescoping member and for driving the second engaging assembly to disengage from the third telescoping member simultaneously.

* * * * *