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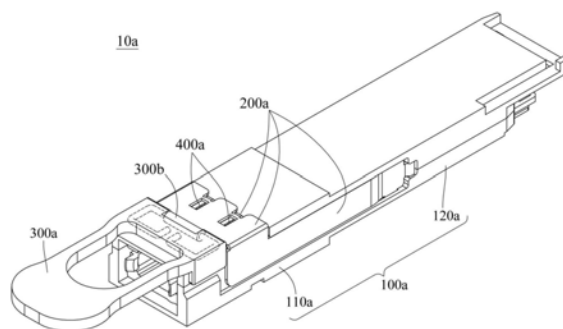
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(54)发明名称

光收发器

(57)摘要

一种光收发器,用于可插拔地插入笼子。光收发器包含主体、弹性件以及卡合件。主体具有二侧面以及外表面。外表面介于二侧面之间,且外表面具有限位槽。弹性件设置于限位槽内。卡合件可移动地设置于主体,且卡合件包含连接臂、二延伸臂以及限位部。连接臂设置于主体的外表面。二延伸臂连接于连接臂,且分别设置于主体的二侧面。限位部连接于连接臂,且延伸至限位槽内以抵压弹性件。二延伸臂适于可拆卸地卡合于笼子。



1. 一种光收发器,用于可插拔地插入一笼子,该光收发器包含:

一主体,具有二侧面以及一外表面,该外表面介于该二侧面之间,且该外表面具有一限位槽;

一弹性件,设置于该限位槽内;以及

一卡合件,可移动地设置于该主体,该卡合件包含一连接臂、二延伸臂以及一限位部,该连接臂设置于该主体的该外表面,该二延伸臂连接于该连接臂,该二延伸臂分别设置于该主体的该二侧面,该限位部连接于该连接臂,该限位部延伸至该限位槽内以抵压该弹性件,且该二延伸臂适于可拆卸地卡合于该笼子。

2. 如权利要求1所述的光收发器,其中该主体的该外表面是该主体的一顶面或一底面。

3. 如权利要求1所述的光收发器,其中该主体更具有形成该限位槽的一第一限位面,该卡合件的该限位部具有面向该第一限位面的一第二限位面,且该弹性件设置于该第一限位面与该第二限位面之间。

4. 如权利要求1所述的光收发器,其中该连接臂具有一开口,且该开口与该主体的该限位槽连通。

5. 如权利要求4所述的光收发器,其中该开口的尺寸小于该弹性件未被压缩时的长度。

6. 如权利要求4所述的光收发器,其中该开口介于该连接臂的二端之间,且该二延伸臂分别连接于该连接臂的该二端。

7. 如权利要求4所述的光收发器,其中该卡合件的该限位部与该开口经由冲压制程形成。

8. 如权利要求1所述的光收发器,其中该主体包含相连的一头部以及一插入部,该插入部用以可插拔地插入该笼子内,该头部具有该外表面、该二侧面以及一光纤端口。

9. 如权利要求1所述的光收发器,更包含一枢轴以及一拉柄,该枢轴枢设于该卡合件的该连接臂,且该拉柄连接于该枢轴。

10. 如权利要求1所述的光收发器,其中该光收发器是四路小型可插拔双密度(QSFP-DD, Quad Small Form-factor Pluggable Double Density)光收发器。

11. 一种光收发器,包含:

一主体,具有二侧面以及一外表面,该外表面介于该二侧面之间,且该外表面具有彼此间隔的二限位槽;

二弹性件,分别设置于该二限位槽内;以及

一卡合件,可移动地设置于该主体,该卡合件包含一连接臂、二延伸臂以及二限位部,该连接臂设置于该主体的该外表面,该二延伸臂连接于该连接臂,该二延伸臂分别设置于该主体的该二侧面,该二限位部连接于该连接臂,该二限位部分别延伸至该二限位槽内以抵压该二弹性件。

光收发器

技术领域

[0001] 本发明涉及一种光收发器,特别是一种可插拔式的光收发器。

背景技术

[0002] 在现代高速通讯网络中,一般设有光收发器以实现光通讯,而光收发器通常安装于电子通讯设备中。为了增加系统设计的弹性及维修方便,光收发器以可插拔方式插入设置于通讯设备中对应的笼子中。一般而言,此笼子系设置于电路板上,为了界定光收发模块件与对应的笼子之间的电气及机械接口,已提出各种不同的标准,例如用于10GB/s通讯速率的XFP(10Gigabit Small Form Factor Pluggable)标准以及QSFP(Quad Small Form-factor Pluggable)标准等标准。

[0003] 卡合机构用来将光收发器固定于笼子(Cage)内。另一方面,光收发器需要释放机构,以便在需要的时候将光收发器平顺地移出笼子。随着光收发器朝向高通讯速率与小型化的方向发展,设置在光收发器内部的卡合机构以及释放机构会占据过多空间,导致没有足够的内部空间容置实现高通讯速率所需要的光电组件。

发明内容

[0004] 本发明在于提供一种光收发器,有助于解决小型化光收发器的内部因为设置卡合机构以及释放机构而没有足够空间容置光电组件的问题。

[0005] 本发明所揭露的光收发器用于可插拔地插入一笼子。光收发器包含一主体、一弹性件以及一卡合件。主体具有二侧面以及一外表面。外表面介于二侧面之间,且外表面具有一限位槽。弹性件设置于限位槽内。卡合件可移动地设置于主体,且卡合件包含一连接臂、二延伸臂以及一限位部。连接臂设置于主体的外表面。二延伸臂连接于连接臂,且分别设置于主体的二侧面。限位部连接于连接臂,且延伸至限位槽内以抵压弹性件。二延伸臂适于可拆卸地卡合于笼子。

[0006] 本发明另揭露的光收发器,包含一主体、二弹性件以及一卡合件。主体具有二侧面以及一外表面。外表面介于二侧面之间,且外表面具有彼此间隔的二限位槽。二弹性件分别设置于二限位槽内。卡合件可移动地设置于主体并且包含一连接臂、二延伸臂以及二限位部。连接臂设置于主体的外表面,且二延伸臂连接于连接臂。二延伸臂分别设置于主体的二侧面。二限位部连接于连接臂并且分别延伸至二限位槽内以抵压对应的二弹性件。

[0007] 根据本发明揭露的光收发器,弹性件设置于限位槽内,并且限位槽形成在主体的外表面。藉此,主体内部能在宽度方向上拥有较大的容置空间以容纳执行高速通讯所需要的电子组件,进而满足光收发器小型化以及拥有适当大小的可利用容置空间的需求。

[0008] 以上之关于本揭露内容之说明及以下之实施方式之说明系用以示范与解释本发明之精神与原理,并且提供本发明之专利申请范围更进一步之解释。

附图说明：

- [0009] 图1为笼子以及根据本发明第一实施例之光收发器的立体示意图。
- [0010] 图2为图1之光收发器的卡合件于卡合位置的局部放大剖切示意图。
- [0011] 图3为图1之光收发器的卡合件于释放位置的局部放大剖切示意图。
- [0012] 图4为根据本发明第二实施例之光收发器的立体示意图。
- [0013] 图5为图4之光收发器的分解示意图。
- [0014] 图6为图4之光收发器沿剖切线6-6的局部放大剖切示意图。
- [0015] 图7为图4之光收发器沿剖切线7-7的局部放大剖切示意图。
- [0016] 图8为图4之光收发器的拉柄被竖立起来的立体示意图。
- [0017] 符号说明：
- [0018] 光收发器 10、10a
- [0019] 笼子 20
- [0020] 插槽 22
- [0021] 弹臂 24
- [0022] 主体 100、100a
- [0023] 头部 110、110a
- [0024] 插入部 120、120a
- [0025] 侧面 130、130a
- [0026] 限位槽 140
- [0027] 外表面 140a
- [0028] 限位槽 150a
- [0029] 光纤端口 160、160a
- [0030] 第一限位面 170a
- [0031] 卡合件 200、200a
- [0032] 连接臂 210、210a
- [0033] 延伸臂 220、220a
- [0034] 卡合部 230
- [0035] 斜面 231
- [0036] 限位部 240、240a
- [0037] 开口 250a
- [0038] 第二限位面 260a
- [0039] 拉柄 300、300a
- [0040] 枢轴 300b
- [0041] 弹性件 400、400a

具体实施方式

[0042] 以下在实施方式中详细叙述本发明之详细特征以及优点，其内容足以使任何熟习相关技艺者了解本发明之技术内容并据以实施，且根据本说明书所揭露之内容、申请专利范围及图式，任何熟习相关技艺者可轻易地理解本发明相关之目的及优点。以下之实施例

系进一步详细说明本发明之观点,但非以任何观点限制本发明之范畴。

[0043] 请参照图1和图2。图1为笼子以及根据本发明第一实施例之光收发器的立体示意图。图2为图1之光收发器的卡合件于卡合位置的局部放大剖切示意图。在本实施例中,提供一光收发器10,其可以可插拔的方式插入一笼子20内。光收发器10包含一主体100、一卡合件200、一拉柄300以及二弹性件400。

[0044] 主体100例如但不限于是一外壳,其包含相连的一头部110以及一插入部120。插入部120用以可插拔地插设于笼子20的一插槽22内。光收发器10的头部110具有二侧面130、二滑轨以及二限位槽140。二滑轨分别形成于二侧面130上并且自头部110延伸至插入部120。二限位槽140分别形成于二侧面130上,以容置前述的二弹性件400。

[0045] 卡合件200包含一连接臂210以及二延伸臂220。二延伸臂220分别连接于连接臂210的相对二侧,也就是说连接臂210介于二延伸臂220之间。延伸臂220可移动地设置于侧面130上的滑轨。二延伸臂220各自包含一卡合部230以及一限位部240。卡合部230沿着远离侧面130的方向延伸而可拆卸地伸入限位槽140内,以抵压位于限位槽140内的弹性件400。

[0046] 拉柄300连接于卡合件200的连接臂210,并且拉柄300自主体100向外延伸。拉柄300可由橡胶制成,其具有可弯折性而能移动至头部110前方或是头部110上方。

[0047] 弹性件400常态地抵压卡合件200的限位部240。在本实施例中,限位槽140与弹性件400的数量只是举例,其并非用以限制本发明。

[0048] 卡合件200可相对主体100移动而具有卡合位置(请参阅图2)以及释放位置(请参阅图3)。图3为图1之光收发器的卡合件于释放位置的局部放大剖切示意图。

[0049] 如图2所示,二弹性件400分别推抵卡合件200的二限位部240,使得卡合件200能够维持于卡合位置,进而二卡合部230稳固地卡合于笼子20。藉此,光收发器10能轻易并且可靠地插设于笼子20的插槽22内。

[0050] 如图2和图3所示,拉柄300可沿着箭头a指示的方向被拖拉。卡合件200经由拉柄300驱动而相对于主体200,进而移动至释放位置。卡合部230推抵笼子20的一弹臂24,而令卡合件200的卡合部230顺着自身的一斜面231滑动。卡合部230弯曲弹臂24而让卡合件200移动至释放位置。当继续拉动拉柄300时,主体100的插入部120自笼子20被移除。

[0051] 当卡合件200位于释放位置时,二限位部240分别压缩二弹性件400。当拉柄300被释放,储存在弹性件400的弹性位能驱使卡合件200复位至卡合位置。

[0052] 拉柄300可被转动而位于主体100之头部110的上方,致使可提供一些让位空间,以使光纤接头(未绘示)能以可插拔形式方便地插入一光纤端口160中。

[0053] 在第一实施例中,拉柄300有助于卡合件200的移动,而使卡合件有卡合于笼子或是自笼子被释放的可行性。

[0054] 在第一实施例中,弹性件400设置于形成在主体100之侧面130上的限位槽140内,并且延伸臂220的限位部240抵压弹性件400。然而,收发器10的革新趋势在某方面来说注重缩小整体尺寸以及主体100的内部空间。为了在侧面130上形成限位槽140,主体100的内部空间在宽段方向上被限制了尺寸,这不利于例如多个光发射器与多个光接收器等电子组件的配置。

[0055] 此外,第一实施例中的拉柄300可以相对主体100转动。然而,如果缺乏任何外力施加于拉柄300,其可能就会回归到其初始位置,因此任何额外光纤插入光纤端口160(可能是

一个开关)都需要额外的操作步骤。

[0056] 为了解决上述问题,光收发器10的结构可以进一步改良。请参照图4和图5。4为根据本发明第二实施例之光收发器的立体示意图。图5为图4之光收发器的分解示意图。在本实施例中,光收发器10a为四路小型可插拔双密度(QSFP-DD, Quad Small Form-factor Pluggable Double Density)光收发器,并且光收发器10a适于以可插拔的方式插入一笼子(未绘示)内。光收发器10a包含一主体100a、一卡合件200a、一拉柄300a、一枢轴300b以及二弹性件400a。

[0057] 请一并参照图6和图7。图6为图4之光收发器沿剖切线6-6的局部放大剖切示意图。图7为图4之光收发器沿剖切线7-7的局部放大剖切示意图。主体100a包含相连的一头部110a以及一插入部120a。主体100a的头部110a具有包含二侧面130a、一外表面140a以及一光纤端口160a。外表面140a介于二侧面130a之间,并且外表面140a具有二限位槽150a。二限位槽150a彼此间隔配置。主体100a的头部110a更包含二第一限位面170a,且二第一限位面170a分别形成前述的二限位槽150a的至少一部分。在本实施例中,外表面140a为100a主体之上盖的一顶面,但本发明并不以此为限。在其他实施例中,外表面为100a主体之下盖的一底面。主体100a内部的一容置空间用以置放所需组件,例如光纤端口160a、电路板、光电二极管、雷射发射器和IC芯片。

[0058] 卡合件200a可移动地设置于主体100a,并且卡合件200a包含一连接臂210a、二延伸臂220a以及二限位部240a。二延伸臂220a分别与连接臂210a的相对二端连接,也就是说连接臂210a介于二延伸臂220a之间。延伸臂220a可移动地设置于侧面130a,并且延伸臂220a能以可拆卸地方式卡合于笼子。连接臂210a设置于主体100a的外表面140a,并且连接臂210a包含分别与前述的二限位槽150a连通的二开口250a。限位部240a连接于连接臂210a,并且二限位部240a分别延伸至二限位槽150a内。在本实施例中,经由提供一冲压制程裁切卡合件200a而让连接臂210a的一部份变形,而形成卡合件200a的限位部240a与开口250a。开口250a邻近限位部240a。

[0059] 枢轴300b枢设于卡合件200a的连接臂210a,并且拉柄300a设置于枢轴300b。图8为图4之光收发器的拉柄被竖立起来的立体示意图。拉柄300a延伸突出主体100a。当拉柄300a位于如图7所示的一水平位置时,拉柄300a保护光纤端口160a免于灰尘污染,并且可透过拉动拉柄300a以将主体100a的插入部120a从笼子移除。拉柄300a可被转动而自水平位置移动至图8所示的一竖立位置,而能在不需要手动握持住拉柄300a或是以其他方式维持拉柄300a竖立的情况下,就可以方便地执行光纤的安装与拔除。藉由枢轴300b的帮助,即便没有施加任何外力于拉柄300a,拉柄300a也可以保持在竖立位置。

[0060] 弹性件400a例如但不限于是被卡合件200a的限位部240a压缩的弹簧。进一步来说,每个限位部240a皆具有面向第一限位面170a的一第二限位面260a。弹性件400a设置于第一限位面170a以及第二限位面260a之间。当卡合件200a相对主体100a移动时,限位部240a于限位槽150a内移动并且压缩弹性件400a。

[0061] 在本实施例中记载的限位槽150a、延伸臂220a、限位部240a、开口250a以及弹性件400a的数量均非用以限制本发明。

[0062] 卡合件200a的开口250a将弹性件400a显露于外。详细来说,放置弹性件400a到限位槽150a的一种方法,是手动压缩弹性件400a,接着将弹性件400a经由开口250a放入限位

槽150a中。如此一来,可以更有效率地装设或卸除弹性件400a。如图7所示,为了维持弹性件400a的位置,开口250a的尺寸小于弹性件400a未被压缩时的长度 L_1 。在本实施例中,未被压缩的状态是指卡合件200a的限位部240a没有抵压弹性件400a的情况。

[0063] 此外,如图5所示,开口250a位于连接臂210a的二端之间,且二延伸臂220a分别连接于连接臂210a的二端。藉此,开口250a不会形成在连接臂210a的边缘(即连接臂210a与延伸臂220a的连接点)。由于连接臂210a的边缘因为较高的内应力而较难加工,故避免开口250a形成在连接臂210a的边缘将有助于使卡合件200a的加工制造变得容易。

[0064] 根据本发明所揭露的光收发器,在一实施例中,弹性件400a设置于限位槽150a内,并且限位槽150a是形成在主体100a的顶面或底面,而不是形成在主体100a的侧面130a,藉此,主体100a内部能在宽度方向W上拥有较大的容置空间以容纳执行高速通讯所需要的电子组件,进而满足光收发器10a小型化以及拥有适当大小的可利用容置空间的需求。

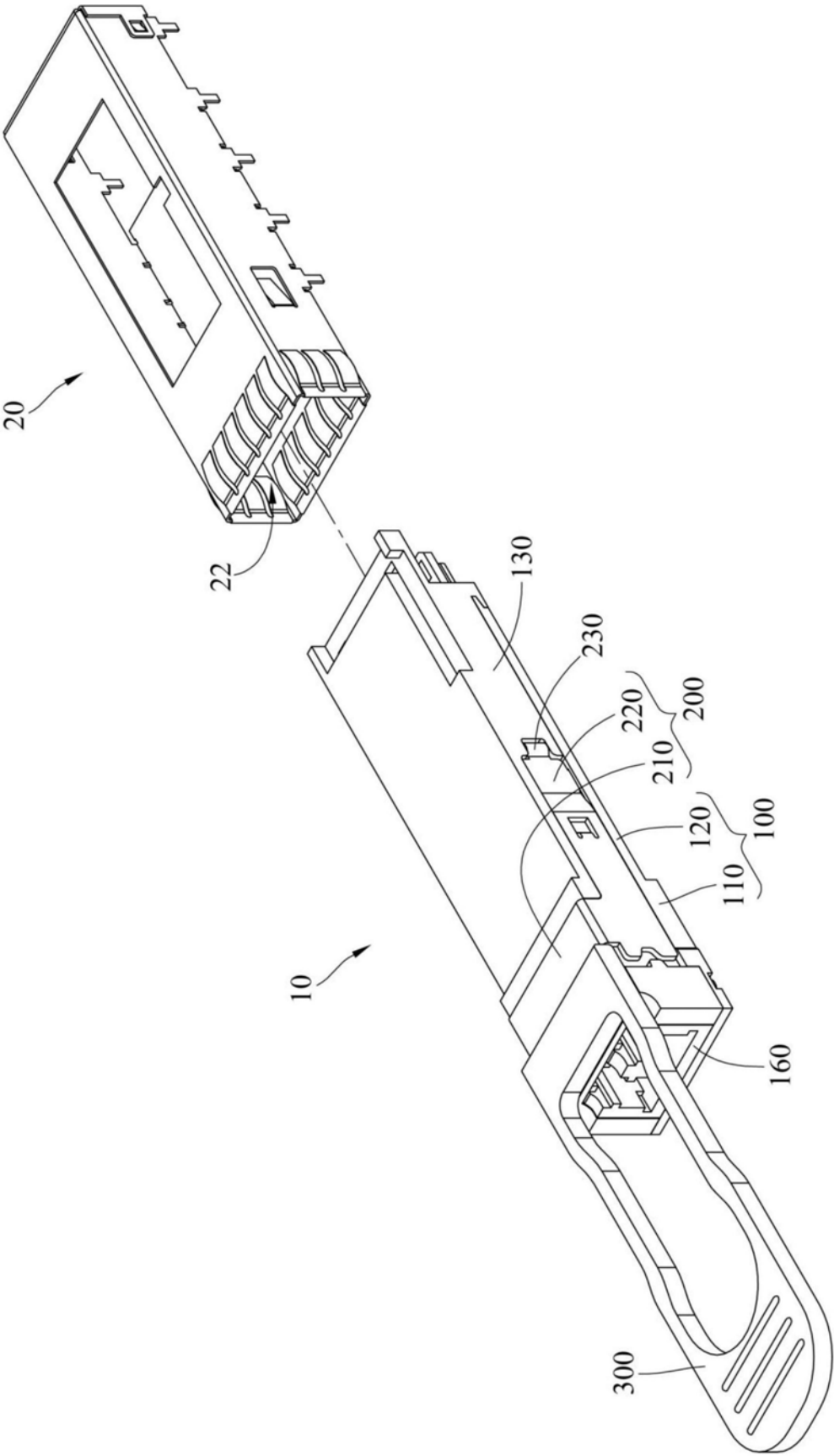


图1

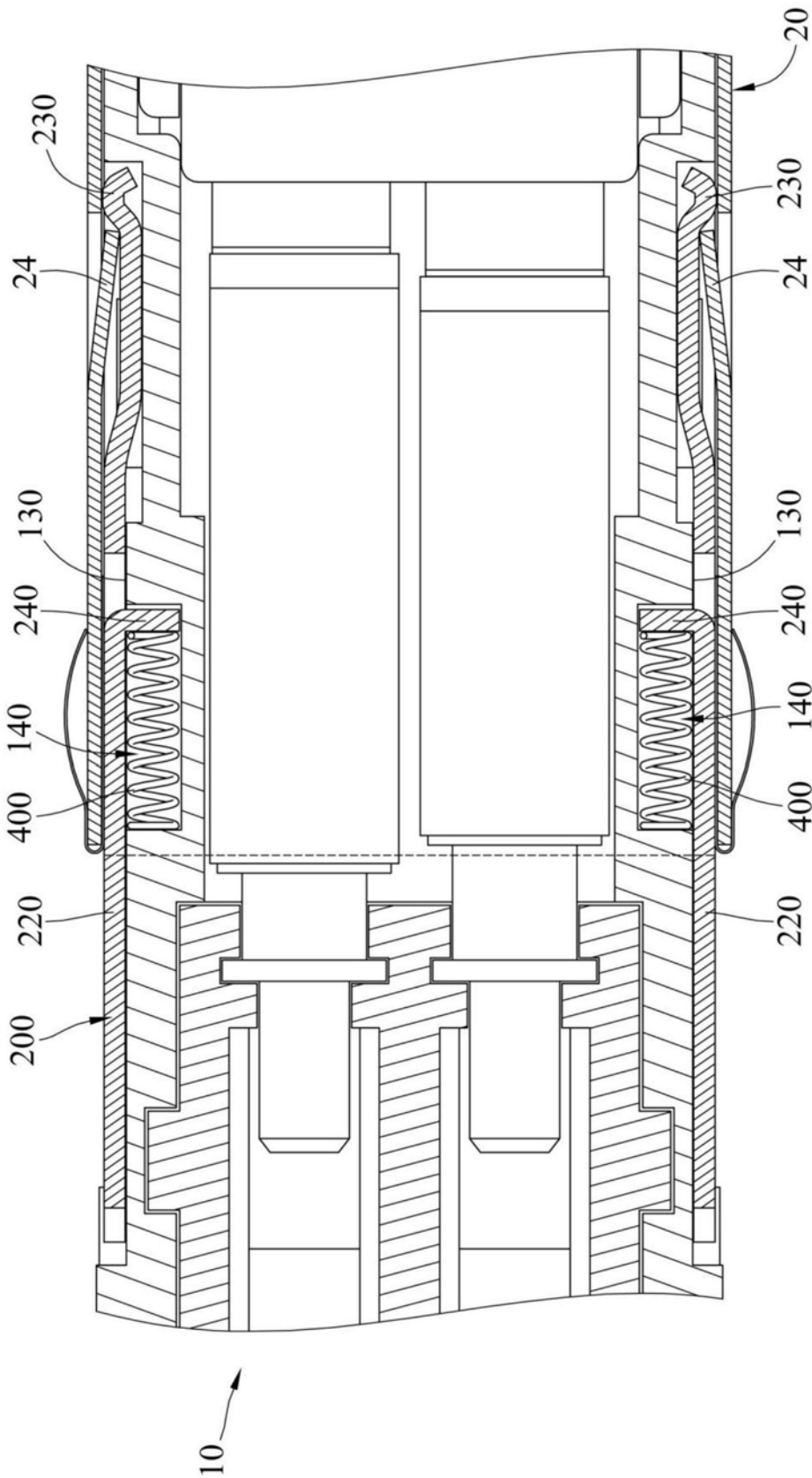


图2

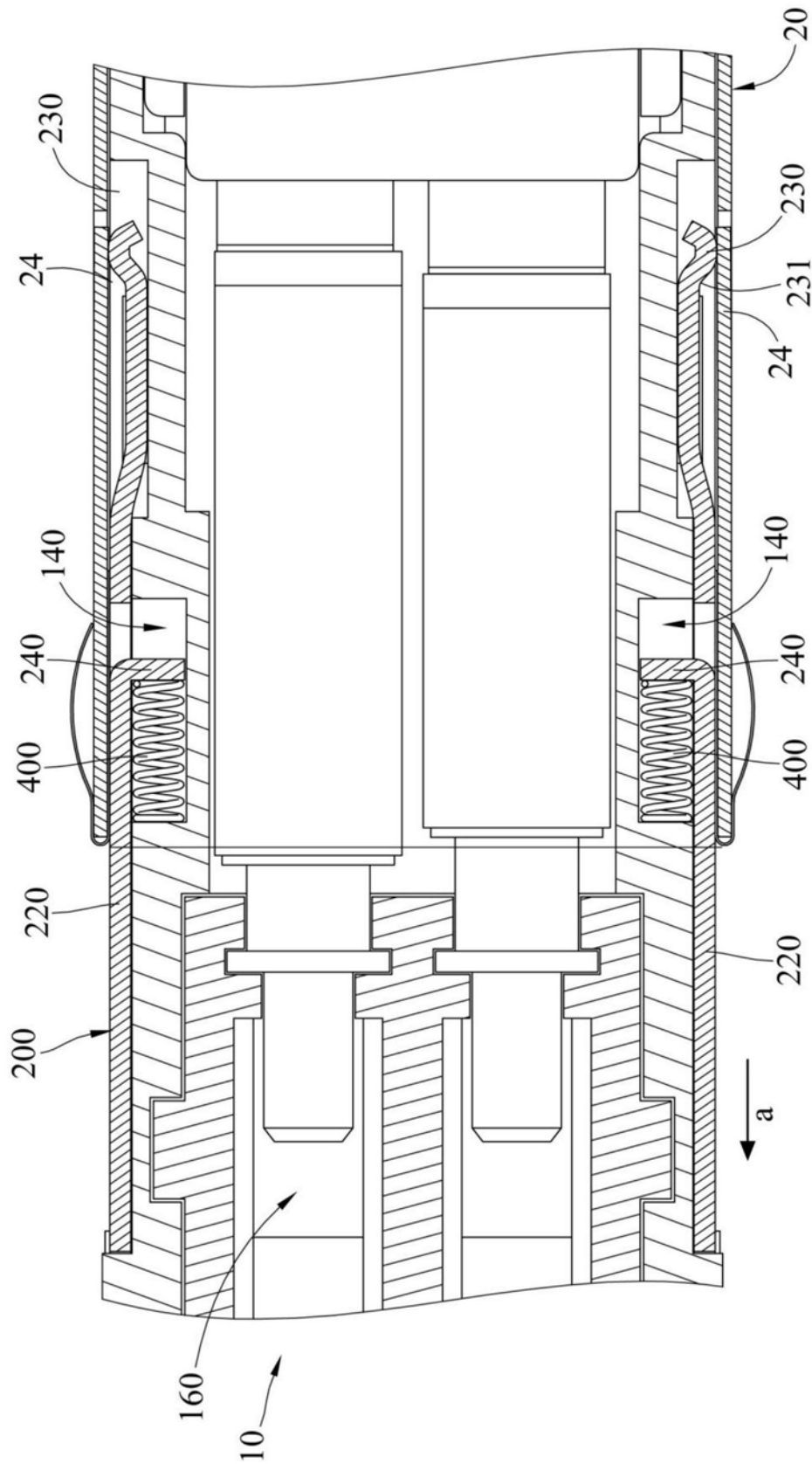


图3

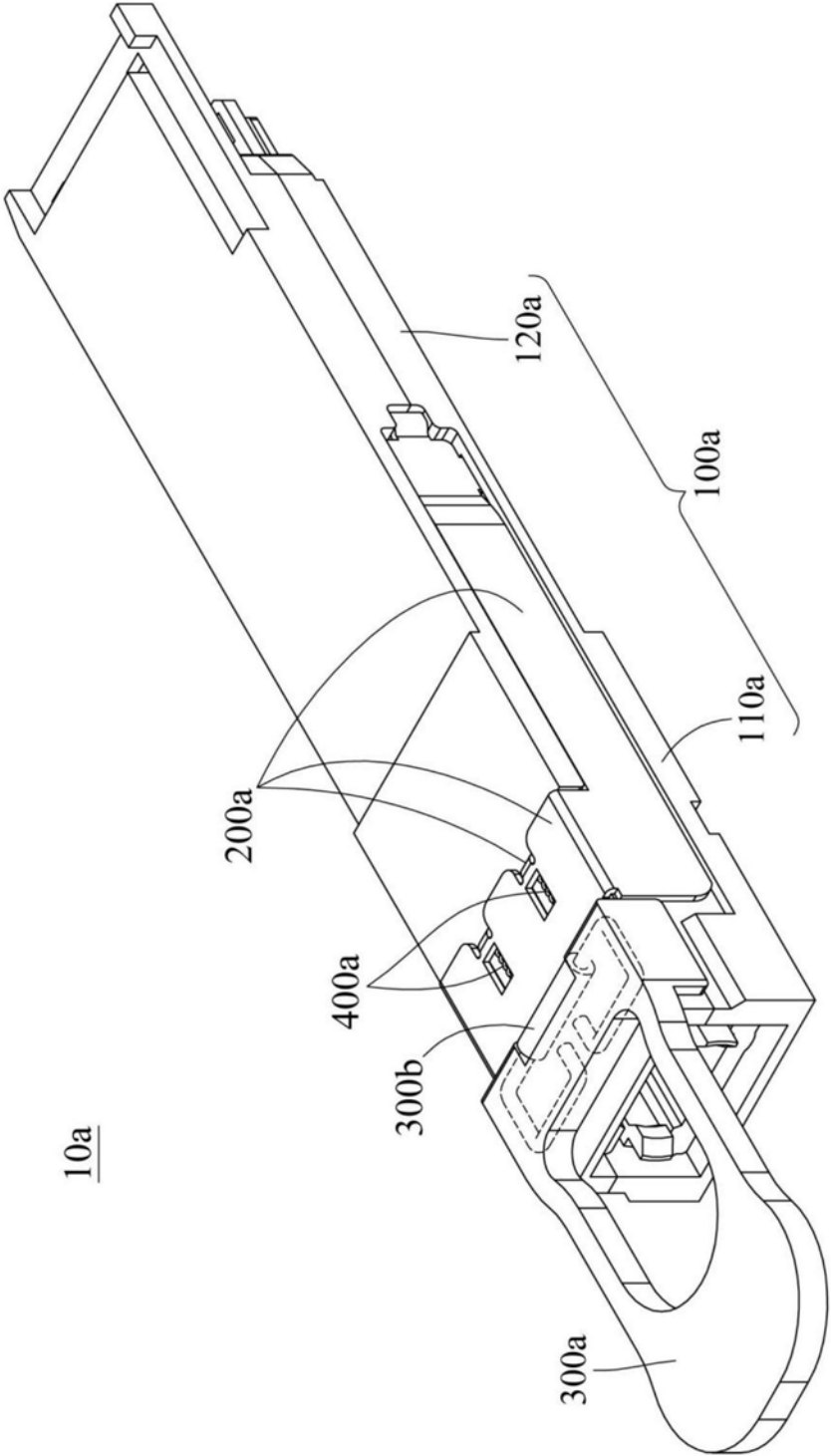


图4

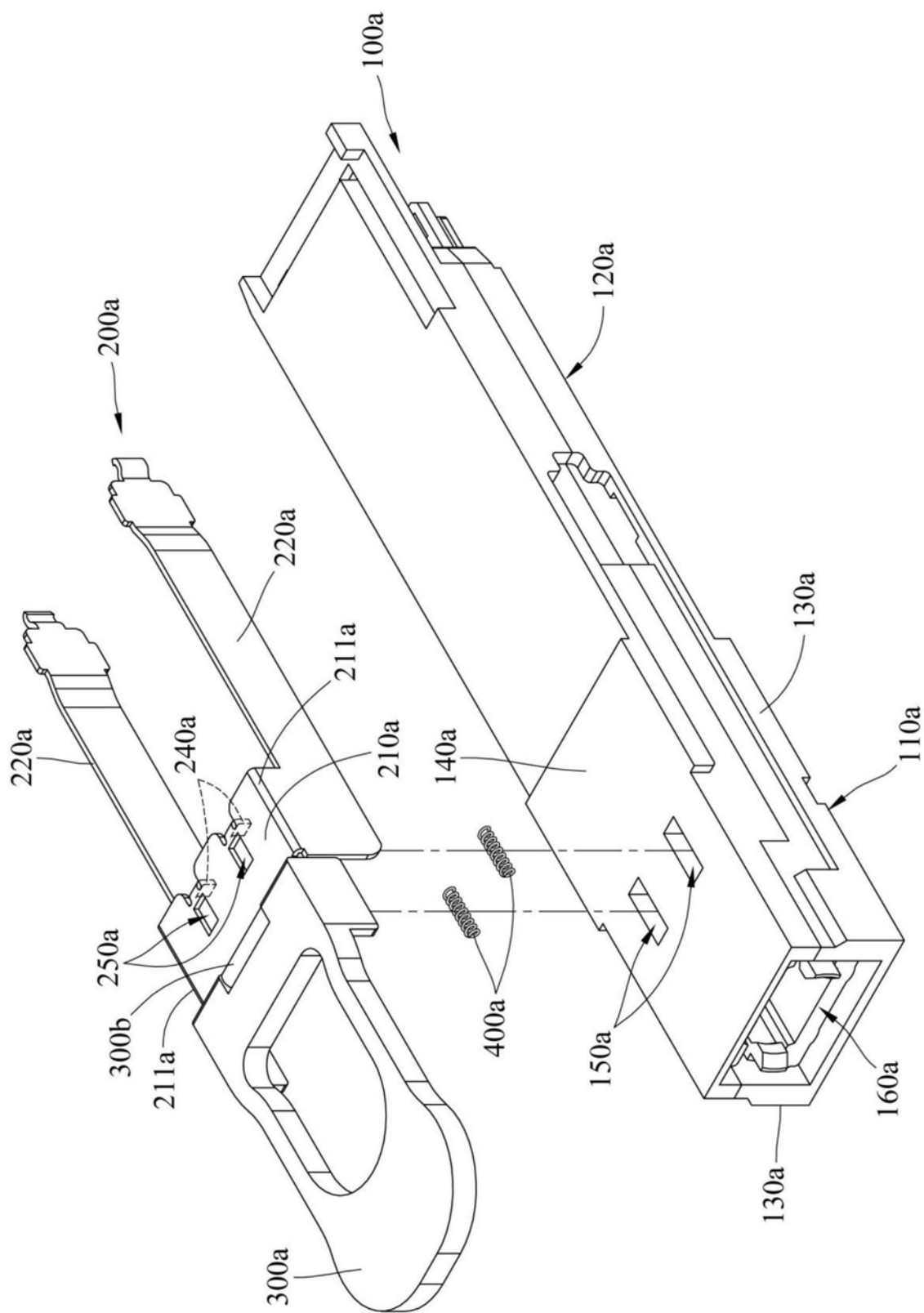


图5

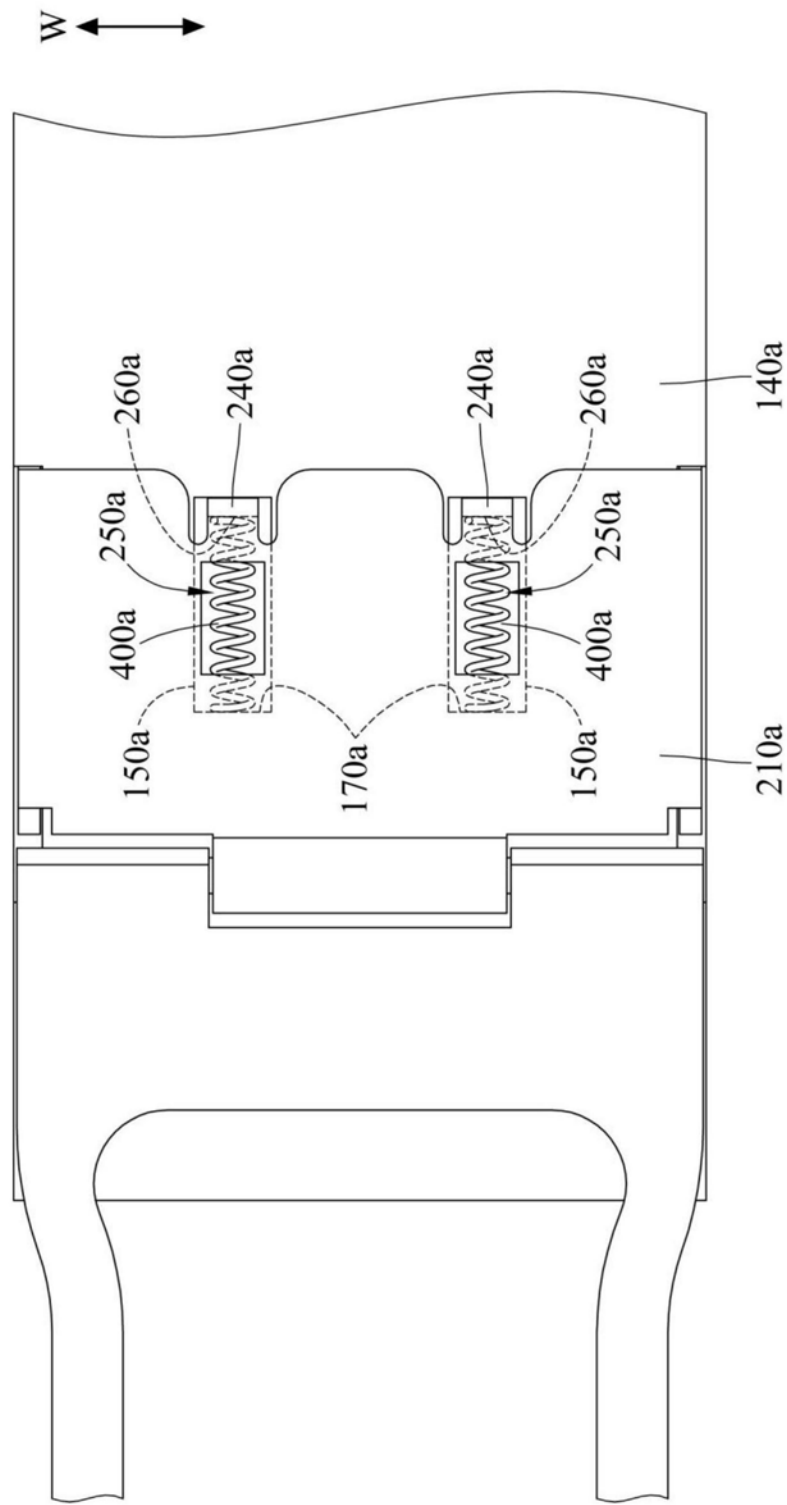


图6

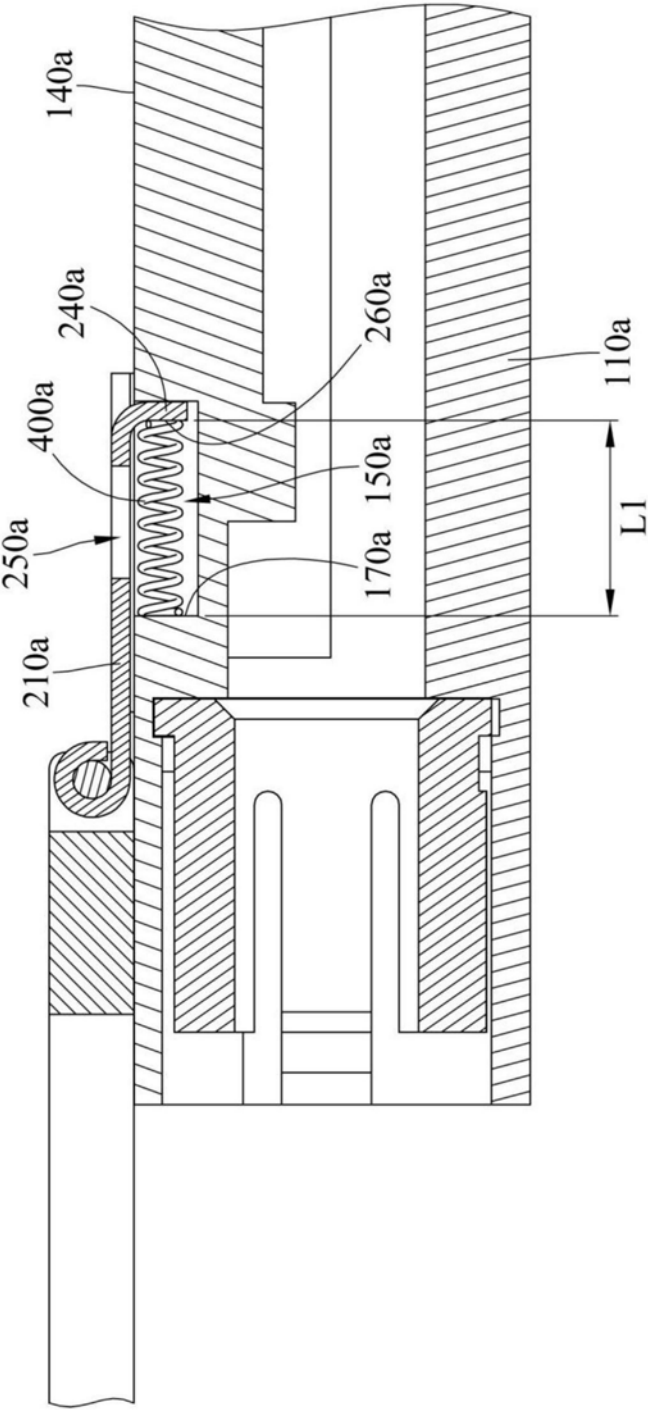


图7

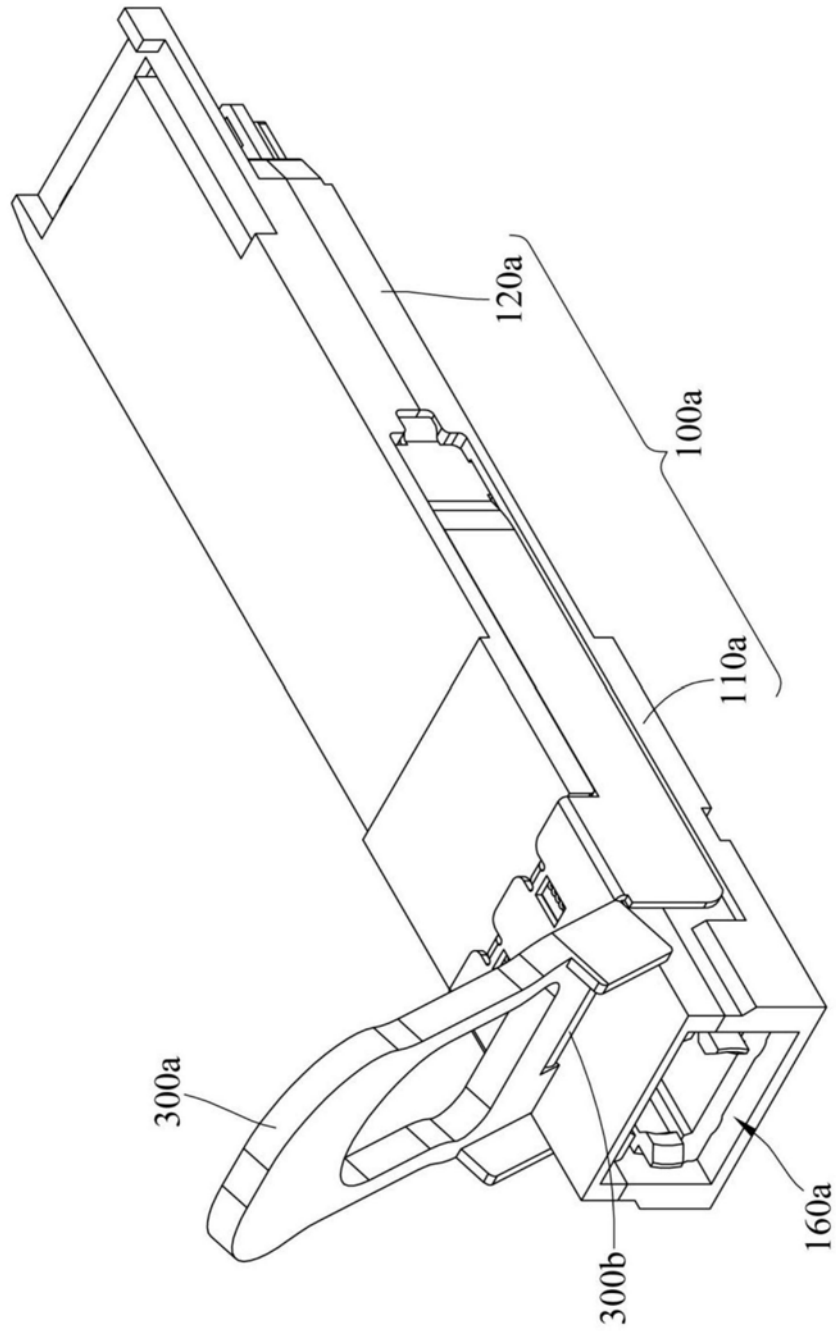
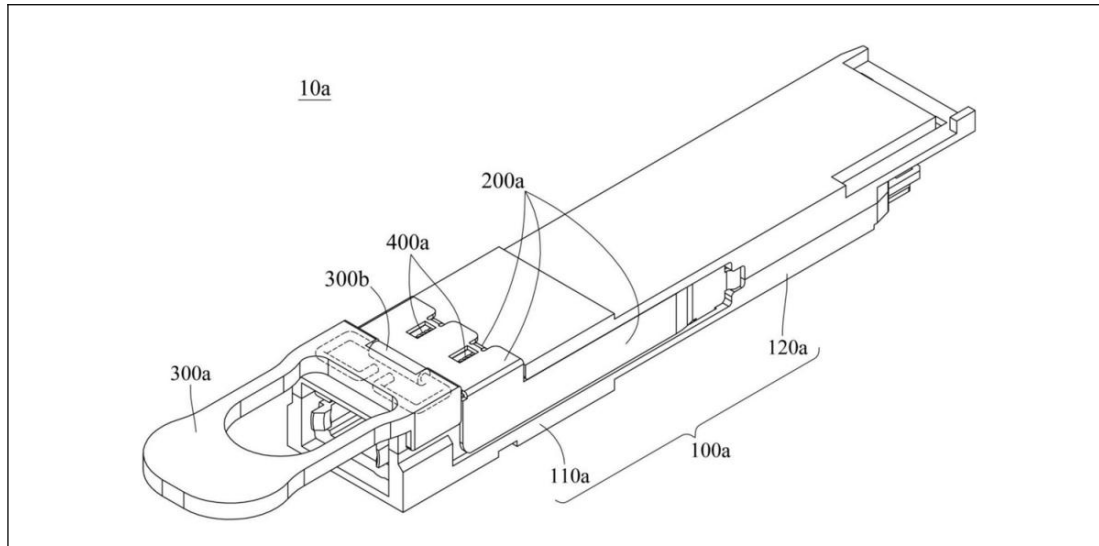


图8

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Claims: 1 page; Description: 5 pages; Drawings: 8 pages
(54) Title of Invention Optical Transceiver
(57) Abstract An optical transceiver is inserted into a cage in pluggable manner. The optical transceiver includes a main body, an elastic component and a fastening component. The main body includes two lateral surfaces and an outer surface between the two lateral surfaces, and the outer surface defines a confined groove. The elastic component is disposed in the confined groove. The fastening component is movably disposed on the main body, and the fastening component includes a linkage arm, two extending arms and a confined portion. The linkage arm is disposed on the outer surface of the main body. The two extending arms are connected with the linkage arm and respectively disposed on the two lateral surfaces of the main body. The confined portion is connected with the linkage arm and extends into the confined groove in order to press the elastic component. The two extending arms are detachably fasten-able with the cage.



Claims

1. An optical transceiver, configured to be inserted into a cage in a pluggable manner, comprising: a main body comprising two lateral surfaces and an outer surface between the two lateral surfaces, and the outer surface defining a confined groove; an elastic component disposed in the confined groove; and a fastening component movably disposed on the main body, the fastening component comprising a linkage arm, two extending arms and a confined portion, wherein the linkage arm is disposed on the outer surface of the main body, the two extending arms are connected with the linkage arm, the two extending arms are respectively disposed on the two lateral surfaces, the confined portion is connected with the linkage arm and extends into the confined groove in order to press the elastic component, and the two extending arms are detachably fasten-able with the cage.
2. The optical transceiver according to claim 1, wherein the outer surface is either a top surface or a bottom surface of the main body.
3. The optical transceiver according to claim 1, wherein the main body comprises a first confined surface forming the confined groove, the confined portion of the fastening component comprises a second confined surface facing toward the first confined surface, and the elastic component is disposed between the first confined surface and the second confined surface.
4. The optical transceiver according to claim 1, wherein the linkage arm comprises an opening in communication with the confined groove of the main body.
5. The optical transceiver according to claim 4, wherein a size of the opening is smaller than a length of the elastic component in an uncompressed condition.
6. The optical transceiver according to claim 4, wherein the opening is located between two ends of the linkage arm where the two extending arms are connected.
7. The optical transceiver according to claim 4, wherein the confined portion and the

opening of the fastening component are formed by stamping.

8. The optical transceiver according to claim 1, wherein the main body comprises a head portion and an insertion portion connected with each other, the insertion portion is configured to be inserted into the cage in a pluggable manner, the head portion comprises the outer surface, the two lateral surfaces and an optical fiber terminal.

9. The optical transceiver according to claim 1, further comprising a pivot shaft pivoted on the linkage arm of the fastening component and a bail connected with the pivot shaft.

10. The optical transceiver according to claim 1, wherein the optical transceiver is a QSFP-DD (Quad Small Form-factor Pluggable Double Density) optical transceiver.

11. An optical transceiver, comprising: a main body comprising two lateral surfaces and an outer surface between the two lateral surfaces, and the outer surface defining two confined grooves spaced apart from each other; two elastic components disposed in the two confined grooves, respectively; and a fastening component movably disposed on the main body, the fastening component comprising a linkage arm, two extending arms and two confined portions, wherein the linkage arm is disposed on the outer surface of the main body, the two extending arms are connected with the linkage arm, the two extending arms are respectively disposed on the two lateral surfaces, the two confined portions are connected with the linkage arm and respectively extend into the two confined grooves in order to press the two elastic components.

Specification

Optical Transceiver

Technical Field

[0001] The disclosure relates to an optical communication device, more particularly to a pluggable optical transceiver.

Background Information

[0002] Optical transceivers are generally installed in electronic communication facilities in modern high-speed communication networks. In order to make flexible the design of an electronic communication facility and less burdensome the maintenance of the same, an optical transceiver is inserted into a corresponding cage that is disposed in the communication facility in a pluggable manner. Generally speaking, the cage is disposed on a circuit board. In order to define the electrical-to-mechanical interface of the optical transceiver and the corresponding cage, different specifications such as XFP(10 Gigabit Small Form Factor Pluggable)used in 10 GB/s communication rate, QSFP(Quad Small Form-factor Pluggable), or other form factors at different communication rates.

[0003] A fastening mechanism is provided for securely fixing the optical transceiver to the cage. On the other hand, the optical transceiver must include a releasing mechanism so that the optical transceiver could be released from the cage smoothly when necessary. As optical transceivers develop toward high-speed communication and miniaturization, the fastening mechanism and release mechanism provided inside the optical transceiver will occupy too much space, resulting in insufficient internal space for installing optoelectronic components required for high-speed communication.

Summary of the Invention

[0004] The present disclosure is to provide an optical transceiver, which helps to solve the problem that the interior of a miniaturized optical transceiver does not have enough space to accommodate optoelectronic components due to the provision of a fastening mechanism and a release mechanism.

[0005] The optical transceiver disclosed in the present disclosure is configured to be inserted into a cage in a pluggable manner. The optical transceiver includes a main body, an elastic component and a fastening component. The main body includes two lateral surfaces and an outer surface between the two lateral surfaces, and the outer surface defines a confined groove. The elastic component is disposed in the confined groove. The fastening component is movably disposed on the main body. The fastening component includes a linkage arm, two extending arms and a confined portion. The linkage arm is disposed on the outer surface of the main body, and the two extending arms are connected with the linkage arm. The two extending arms are respectively disposed on the two lateral surfaces. The confined portion is connected with the linkage arm and extends in the confined groove in order to press the elastic component. The two extending arms

are detachably fasten-able with the cage.

[0006] The optical transceiver further disclosed in the present disclosure includes a main body, two elastic components and a fastening component. The main body includes two lateral surfaces and an outer surface between the two lateral surfaces, and the outer surface defines two confined grooves spaced apart from each other. The two elastic components are disposed in the two confined grooves, respectively. The fastening component is movably disposed on the main body. The fastening component includes a linkage arm, two extending arms and two confined portions. The linkage arm is disposed on the outer surface of the main body, and the two extending arms are connected with the linkage arm. The two extending arms are respectively disposed on the two lateral surfaces. The confined portions are connected with the linkage arm and are respectively extend into the two confined grooves in order to press the two elastic components.

[0007] According to the optical transceiver disclosed in the present disclosure, the elastic component is disposed in the confined groove, and the confined groove is formed on the outer surface of the main body. Thereby, the interior of the main body can have a larger accommodating space in the width direction for accommodating the electronic components required for high-speed communication, thereby meeting the requirements of miniaturization of the optical transceiver and having an appropriately sized available accommodating space.

[0008] The above description of the present disclosure and the following description of the embodiments are intended to demonstrate and explain the spirit and principle of the present disclosure, and to provide a further explanation of the patent application scope of the present disclosure.

Brief Description of the Drawings

[0009] FIG. 1 is a perspective view of a cage and an optical transceiver according to a first embodiment of the present disclosure.

[0010] FIG.2 is a partially enlarged view of the optical transceiver in FIG.1, with a fastening component at a fastening position.

[0011] FIG.3 is a partially enlarged cross-sectional view of the optical transceiver in FIG.1, with the fastening component at a releasing position.

[0012] FIG.4 is a perspective view of an optical transceiver according to a second embodiment of the present disclosure.

[0013] FIG. 5 is an exploded view of the optical transceiver in FIG. 4.

[0014] FIG.6 is a partially enlarged cross-sectional view of the optical transceiver in FIG.4 along line 6-6.

[0015] FIG.7 is a partially enlarged cross-sectional view of the optical transceiver in FIG. 4 along line 7-7.

[0016] FIG.8 is a perspective view of the optical transceiver in FIG.4, with a bail at an

upright position.

[0017] Reference Numerals:

[0018] Optical transceiver: 10, 10a

[0019] Cage: 20

[0020] Slot: 22

[0021] Spring arm: 24

[0022] Main body: 100, 100a

[0023] Head portion: 110, 110a

[0024] Insertion portion: 120, 120a

[0025] Lateral surface: 130, 130a

[0026] Confined groove: 140

[0027] Outer surface: 140a

[0028] Confined groove: 150a

[0029] Optical fiber port: 160, 160a

[0030] First confined surface: 170a

[0031] Fastening component: 200, 200a

[0032] Linkage arm: 210, 210a

[0033] Extending arm: 220, 220a

[0034] Fastening portion: 230

[0035] Inclined surface: 231

[0036] confined portion: 240, 240a

[0037] Opening: 250a

[0038] Second confined surface: 260a

[0039] Bail: 300, 300a

[0040] Pivot shaft: 300b

[0041] Elastic component: 400, 400a

Detailed Description of the Embodiments

[0042] The detailed features and advantages of the present disclosure are described in detail in the following embodiments, and the content is sufficient to enable any person skilled in the relevant art to understand the technical content of the present disclosure and implement it accordingly. Moreover, any person skilled in the relevant art can easily understand the relevant purposes and advantages of the present disclosure according to the content disclosed in this specification, the patent claims, and the drawings. The following embodiments further illustrate the viewpoints of the present disclosure in detail, but do not limit the scope of the present disclosure in any way.

[0043] Please refer to FIG.1 and FIG.2. FIG.1 is a perspective view of an optical transceiver and a cage according to a first embodiment of the present disclosure. FIG.2 is a partially enlarged view of the optical transceiver in FIG. 1, with a fastening component at

a fastening position. In this embodiment, an optical transceiver 10 is disclosed, and the optical transceiver 10 is inserted into a cage 20 in pluggable manner. The optical transceiver 10 includes a main body 100, a fastening component 200, a bail 300 and two elastic components 400.

[0044] The main body 100, for example, is a housing including a head portion 110 and an insertion portion 120 connected with each other. The insertion portion 120 is configured to be inserted into a plugging slot 22 of the cage 20. The head portion 110 of the optical transceiver 10 includes two lateral surfaces 130, two sliding rails and two confined grooves 140. The two sliding rails are respectively formed on the two lateral surfaces 130 and extend from the head part 110 to the insertion portion 120. The two confined grooves 140 are respectively formed on the two lateral surfaces 130 for accommodating the two elastic components 400.

[0045] The fastening component 200 includes a linkage arm 210 and two extending arms 220. The two extending arms 220 are respectively connected with two opposite ends of the linkage arm 210, such that the linkage arm 210 is located between the two extending arms 220. The two extending arms 220 are movably disposed on the sliding rails at the lateral surfaces 130, respectively. Each of the extending arms 220 includes a fastening portion 230 and a confined portion 240. The fastening portion 230 extends along a direction far away from the lateral surface 130 to be detachably fastenable with the cage 20. The confined portion 240 extends into the confined groove 140 for pressing the elastic component 400.

[0046] The bail 300 is connected with the linkage arm 210 of the fastening component 200 and extends outside from the main body 100. The bail 300 is made of rubber and bendable to be in front of the head part 110 or on the top of the head part 110.

[0047] The elastic components 400 constantly press the confined portion 240 of the fastening component 200. It is worth noting that numbers of the confined grooves 140 and the elastic components 400 are not limited in view of embodiments in the present disclosure.

[0048] The fastening component 200 is movable relative to the main body 100 to be at either a fastening position (as shown in FIG.2) and a releasing position (as shown in FIG.3). Please refer to FIG.2 and FIG.3. FIG.3 is a partially enlarged cross-sectional view of the optical transceiver in FIG.1, with the fastening component at a releasing position.

[0049] In FIG.2, the two elastic components 400 respectively press the two confined portions 240 so that the fastening component 200 could be located at the fastening position, and thus the fastening portions 230 are securely fastened with the cage 20. Therefore, the optical transceiver 10 is readily and reliably inserted into the plugging slot 22 of the cage 20.

[0050] As shown in FIG.2 and FIG.3, the bail 300 is able to be drawn along the direction

indicated by an arrow a. The fastening component 200 is moved by the bail 300 relative to the main body 200 to be at the releasing position. The fastening portion 230 presses a flexible arm 24 of the cage 20 so that the fastening component 200 slides along an inclined surface 231 of the fastening portion 230. The fastening portion 230 bends the flexible arm 24 to allow the fastening component 200 to move to the releasing position. The insertion portion 120 of the main body 100 is removed from the cage 20 when the bail 300 is pulled much farther.

[0051] When the fastening component 200 is at the releasing position, the two confined portions 240 respectively compress the two elastic components 400. As the bail 300 is released, the elastic energy stored in the elastic components 400 drives the fastening component 200 back to the fastening position.

[0052] The bail 300 could be moved around to be located above the head part 110 of the main body 100, creating some room for an optical fiber plug (not shown in the drawings) to be plugged into an optical fiber terminal 160 more conveniently.

[0053] In the first embodiment, that the bail 300 could help move the fastening component 200 renders possible the fastening component to fasten to or be released from the cage.

[0054] In the first embodiment, the elastic component 400 is disposed in the confined groove 140 which is formed on the lateral surface 130 of the main body 100, and the confined portion 240 of the extending arm 220 presses the elastic component 400. However, since the trend of evolution of the optical transceiver 10 somewhat focuses on the reduction in size of the entire transceiver as well as the inside space of the main body 100. In order to form the confined grooves 140 on the lateral surfaces 130, the space inside the main body 100 is restricted in a width direction, such that it is unfavorable for the arrangement of electronic components such as multiple transmitters and multiple receivers.

[0055] Furthermore, the bail 300 could be moved around with respect to the main body 100 in the first embodiment. However, absent application of any external force may make the bail 300 simply go back to its initial position, such that extra maneuver of the bail 300 is required for any optical fiber to be plugged into the optical fiber terminal 160 (which might be a switch).

[0056] In order to solve the above problems, a configuration of the optical transceiver 10 could be improved. Please refer to FIG.4 and FIG.5. FIG.4 is a perspective view of an optical transceiver according to a second embodiment of the present disclosure. FIG.5 is an exploded view of the optical transceiver in FIG.4. In this embodiment, an optical transceiver 10a is a QSFP-DD (Quad Small Form-factor Pluggable Double Density) optical transceiver, and the optical transceiver 10 is configured to be inserted into a cage (not shown in the drawings) in pluggable manner. The optical transceiver 10a includes a main body 100a, a fastening component 200a, a bail 300a, a pivot shaft 300b and two

elastic components 400a.

[0057] Please further refer to FIG.6 and FIG.7.FIG.6 is a partially enlarged cross-sectional view of the optical transceiver in FIG.4 along line 6-6.FIG.7 is a partially enlarged cross-sectional view of the optical transceiver in FIG.4 along line 7-7.The main body 100a includes a head portion 110a and an insertion portion 120a connected with each other.The head portion 110a of the main body 100a includes two lateral surfaces 130a, an outer surface 140a and an optical fiber terminal 160a. The outer surface 140a is between the two lateral surfaces 130a, and the outer surface 140a defines two confined grooves 150a which are spatially spaced apart from each other.The head portion 110a of the main body 100a further includes two first confined surfaces 170a with the two confined grooves 150a formed respectively.In this embodiment,the outer surface 140a is a top surface on an upper cover of the main body 100a, but the disclosure is not limited thereto.In some other embodiments, the outer surface is a bottom surface on a bottom cover of the main body 100a. An accommodation space inside the main body 100a allows for placement of components such as the optical fiber terminal 160a, a circuit board,photodiodes,laser emitters,and IC chips.

[0058] The fastening component 200a is movably disposed on the main body 100a and includes a linkage arm 210a,two extending arms 220a and two confined portions 240a.The two extending arms 220a are respectively connected with two opposite ends of the linkage arm 210a, such that the linkage arm 210a is located between the two extending arms 220a. The two extending arms 220 are movably disposed on the lateral surfaces 130a respectively, and the extending arms 220 are detachably fasten-able with the cage.The linkage arm 210a is disposed on the outer surface 140a of the main body 100a,and the linkage arm 210a includes two openings 250a respectively connected with the two confined groove 150a.The two confined portions 240a are connected with the linkage arm 210a, and the two confined portions 240a respectively extend into the confined grooves 150a. In this embodiment, a process of stamping is performed to cut and deform part of the linkage arm 210a to form the confined portions 240a and the openings 250a of the fastening component 200a.The opening 250a is located in proximity of the confined portion 240a.

[0059] The pivot shaft 300b is pivoted on the linkage arm 210a of the fastening component 200a,and the bail 300a disposed on the pivot shaft 300b.FIG.8 is a perspective view of the optical transceiver in FIG.4, with a bail at an upright position. The bail 300a extends outside from the main body 100a.When the bail 300a is at a horizontal position,the bail 300a protects the optical fiber terminal 160a from dust,and the insertion portion 120a of the main body 100a is removed from the cage when the horizontal bail 300a is drawn.The bail 300a could be moved from the horizontal position to an upright position so as render convenient installation or removal of the optical fibers without requiring the bail 300a being

held manually or by other means. With the pivot shaft 300b, the bail 300a could stay at the upright position even without any application of the external force to the bail 300a.

[0060] Each of the elastic components 400a, for example, is a spring compressed by the confined portion 240a of the fastening component 200a. In detail, each confined portion 240a of the fastening component 200a includes a second confined surface 260a facing toward the first confined surface 170a of the main body 100a. The elastic component 400a is disposed between the first confined surface 170a and the second confined surface 260a. When the fastening component 200a moves relative to the main body 100a, the confined portion 240a moves in the confined groove 150a and compresses the elastic component 400a.

[0061] It is worth noting that numbers of the confined grooves 150a, the extending arms 220a, the confined portions 240a, the openings 250a and the elastic components 400a are not limited because of the embodiments discussed in the present disclosure.

[0062] The opening 250a of the fastening component 200a exposes the elastic component 400a to outside. In detail, a method of positioning the elastic component 400a in the confined groove 150a is to compress the elastic component 400a by hand, and then put the elastic component 400a into the confined groove 150a through the opening 250a. Therefore, the elastic component 400a could be mounted or unmounted with more efficiency. As shown in FIG. 7, to maintain the position of the elastic component 400a, a size of the opening 250a is smaller than a length L1 of the elastic component 400a in an uncompressed condition. The uncompressed condition is a condition that the confined portion 240a of the fastening component 200a does not compress the elastic component 400a.

[0063] Furthermore, as shown in FIG. 5, the opening 250a is located between two ends 211a of the linkage arm 210a where the two extending arms 220a are respectively connected. Therefore, the opening 250a does not formed at an edge of the linkage arm 210a, such that it is favorable for an easier manufacture of the fastening component 200a since the edge of the linkage arm 210a is difficult to be processed due to higher internal stress.

[0064] According to the present disclosure, in an embodiment, the elastic component 400a is disposed in the confined groove 150a, and the confined groove 150a is formed on the top surface of the main body 100a rather than on the lateral surface 130a. Therefore, more accommodation space inside the main body 100a could be provided in a width direction W to accommodate electronic components for high-speed communication, thereby meeting the requirements of compact optical transceiver 10a and proper space utilization of the same.

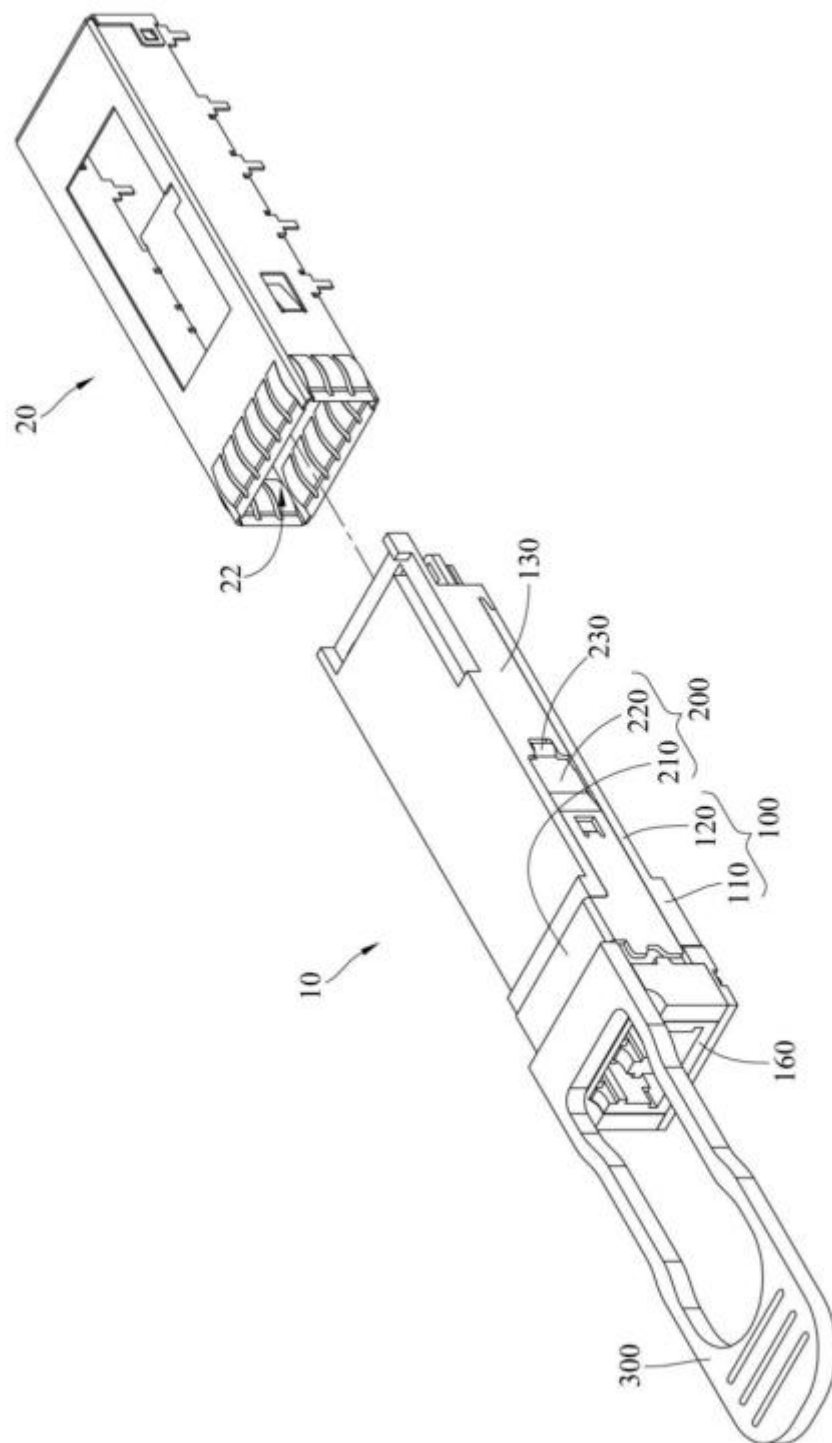


Figure 1

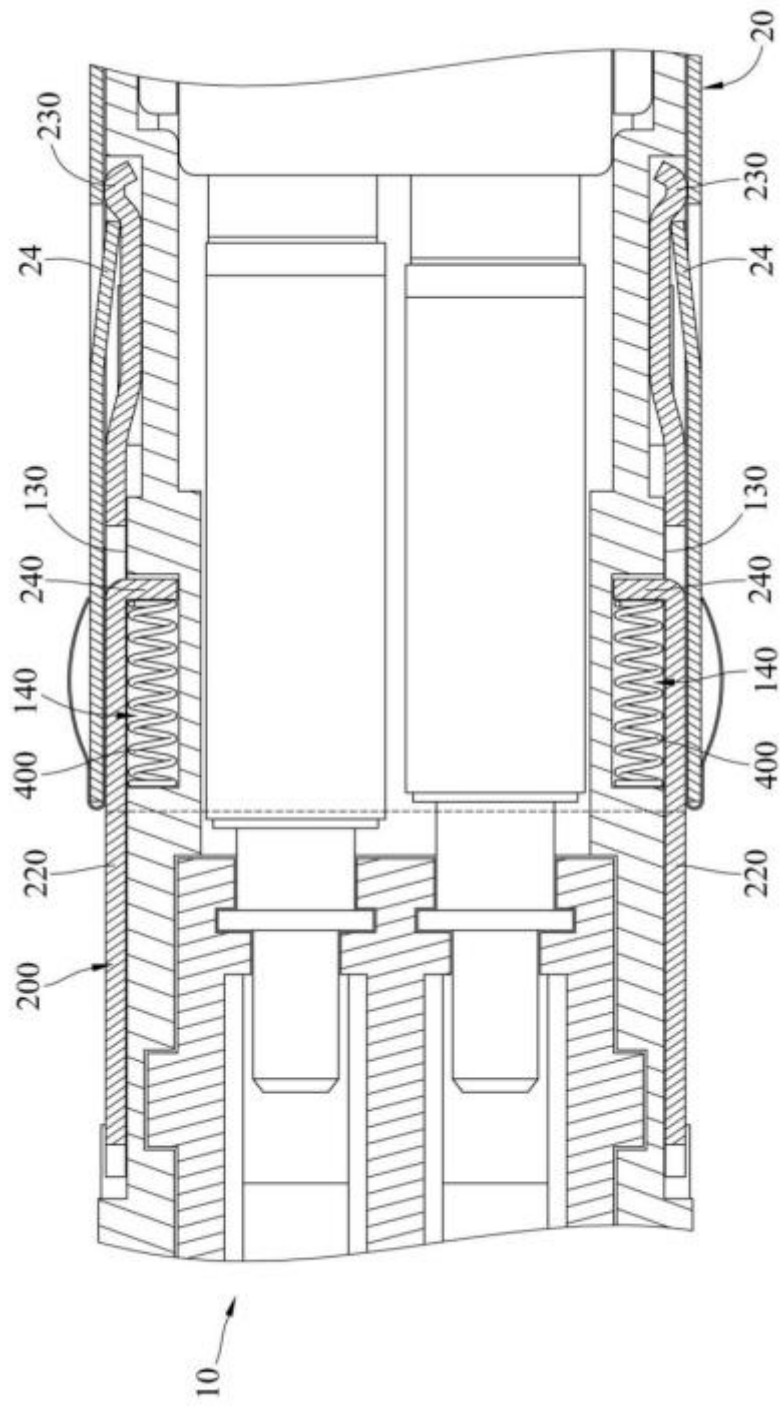


Figure 2

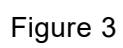


Figure 3

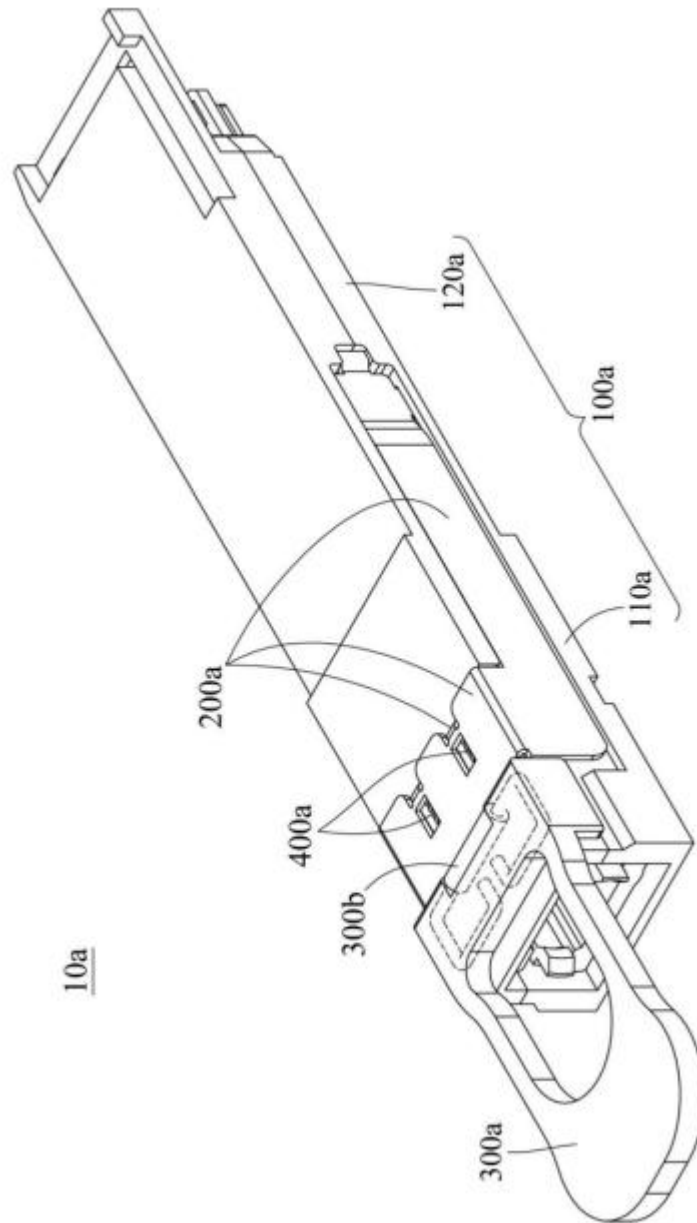


Figure 4

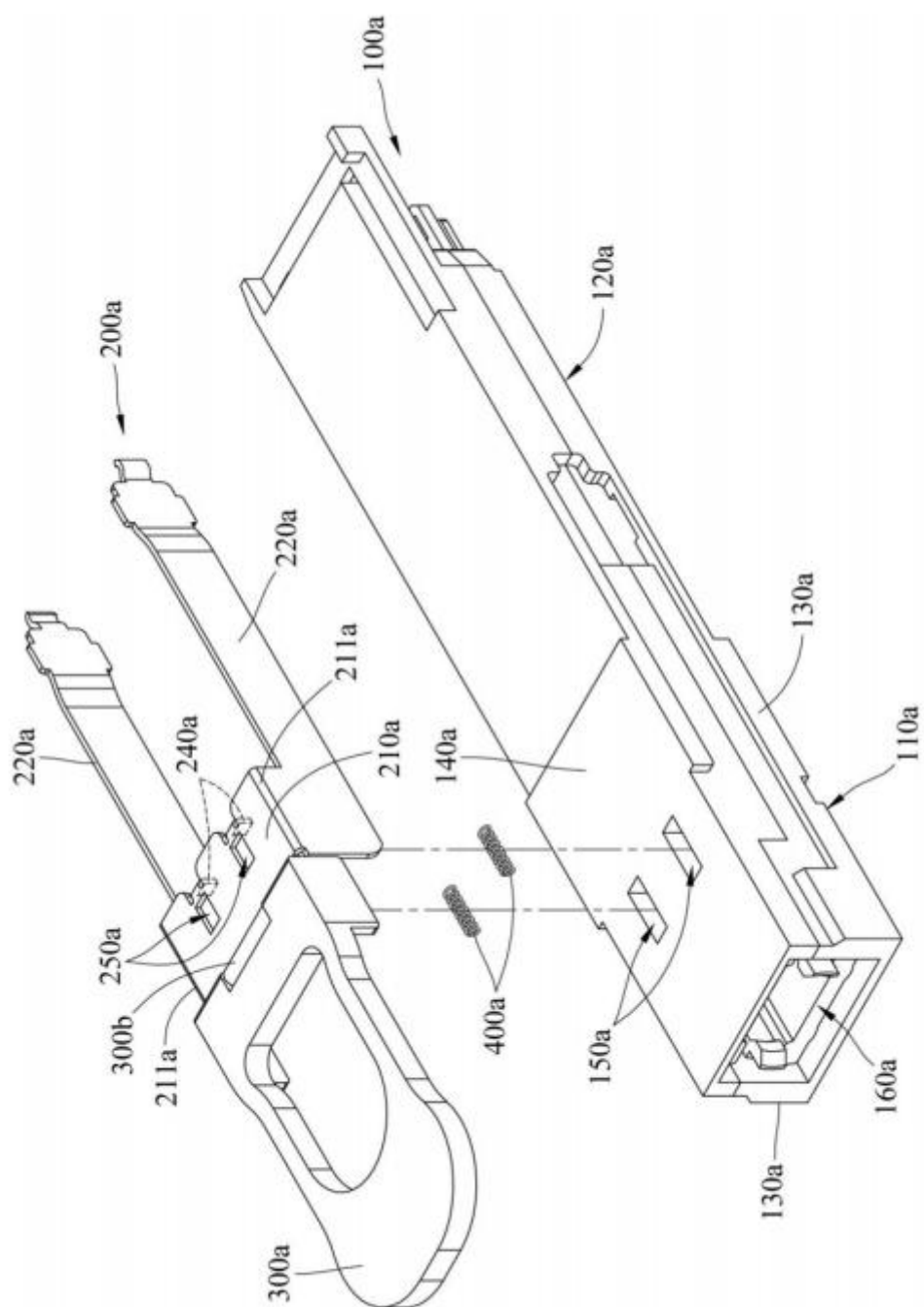


Figure 5

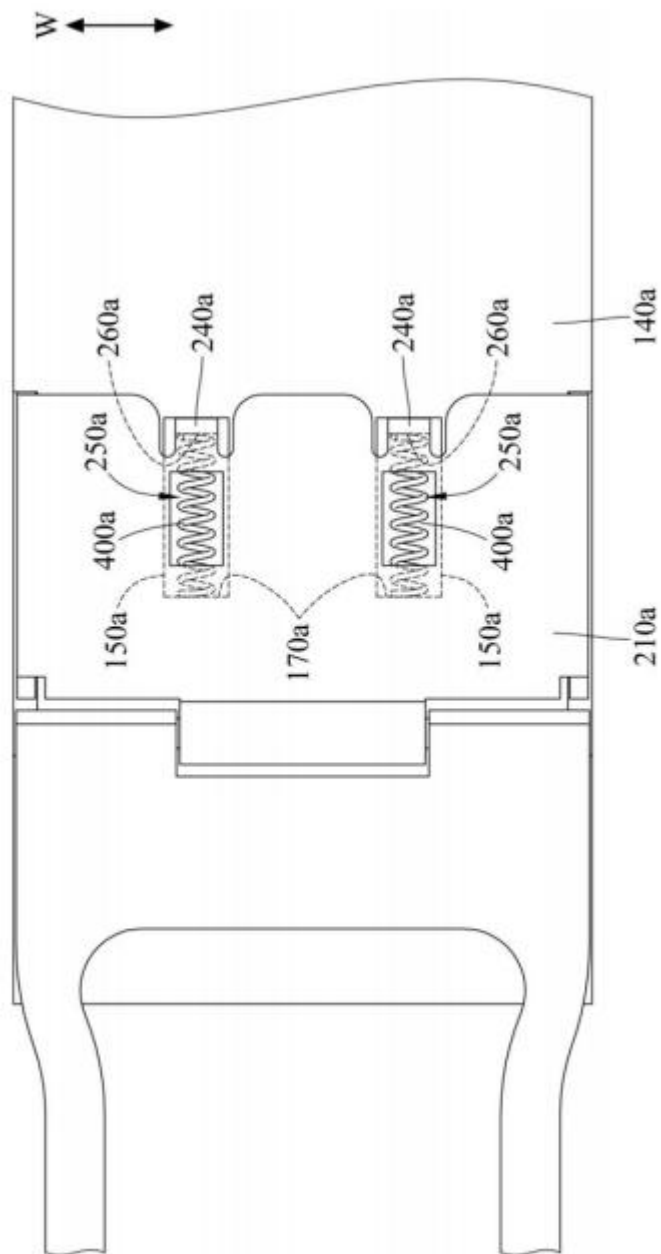


Figure 6

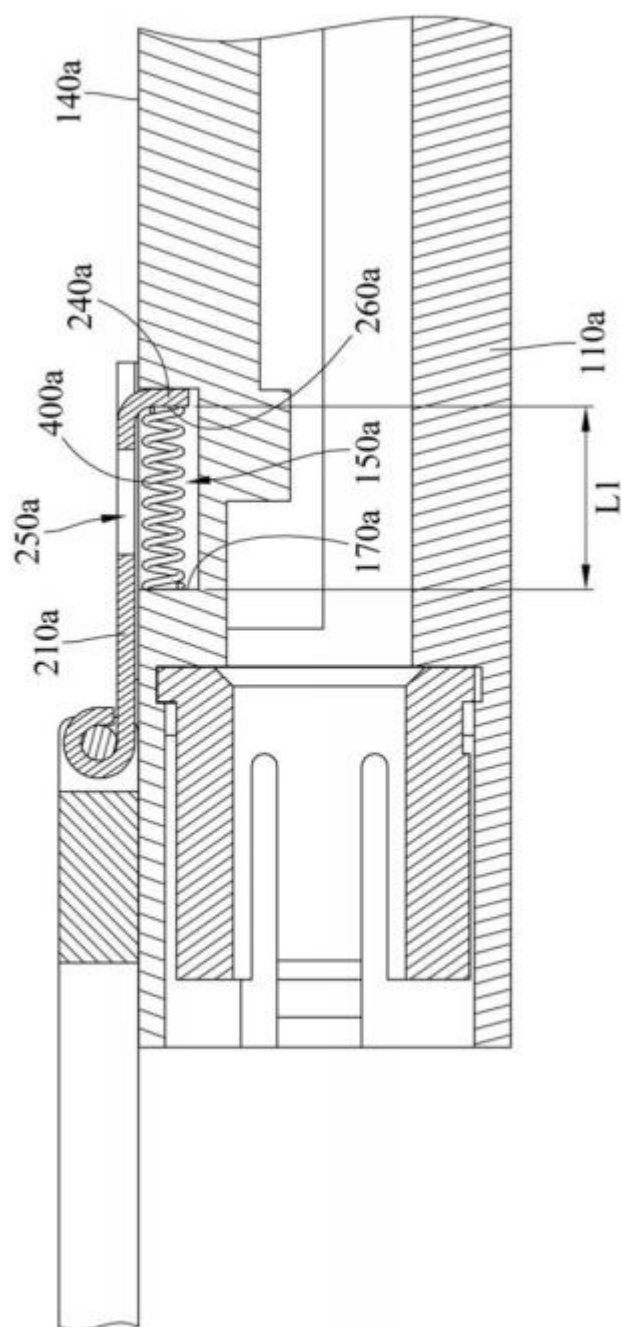


Figure 7

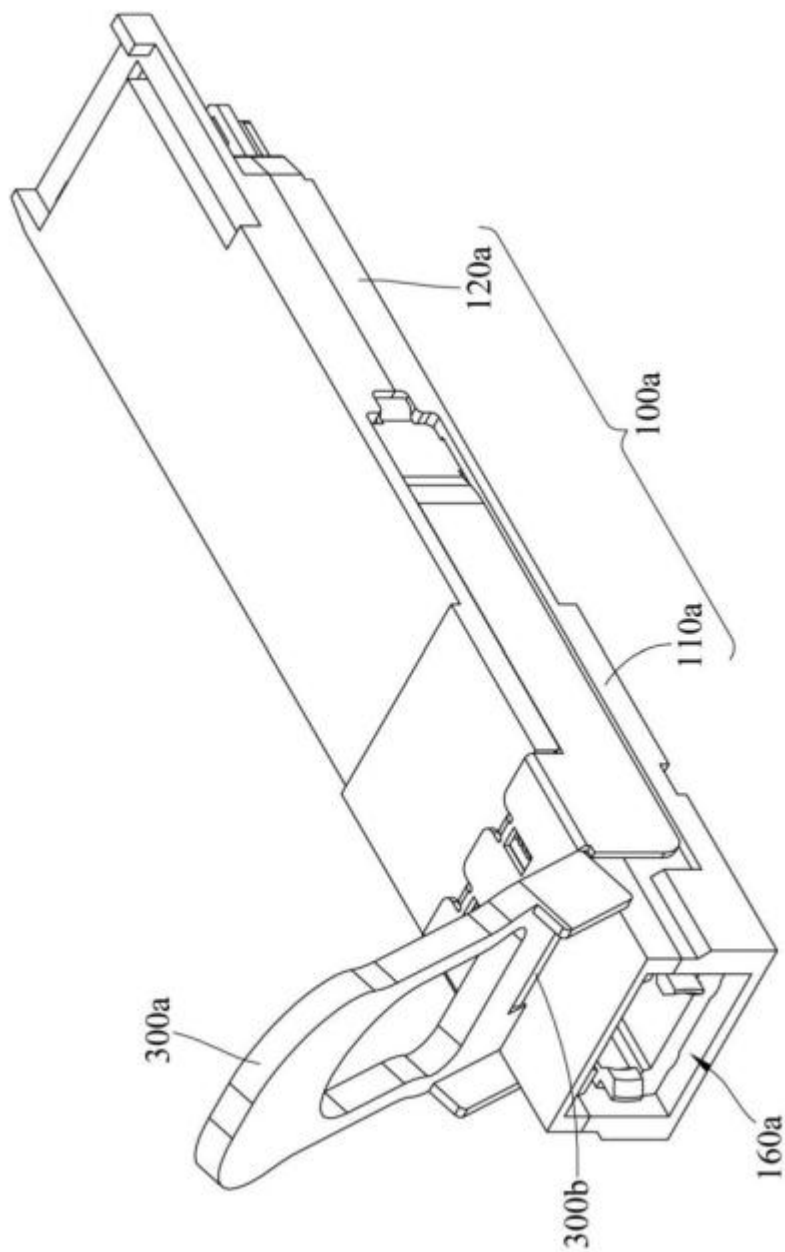


Figure 8