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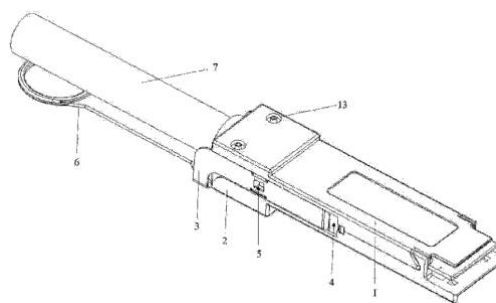
Claims: 1 page Specification: 3 pages Drawings: 3 pages

(54) Title of Utility Model

QSFP MODULE INTERFACE DEVICE

(57) Abstract

The present utility model discloses a QSFP module interface device including: an upper cover, a lower cover, and an elastic arm, wherein two opposite sides of the upper cover are connected to the lower cover at connecting positions, which have first recess portions recessed thereon, the elastic arm is engaged within the first recess portion, and an unlocking device is arranged between the elastic arm and the first recess portion. The QSFP module interface device has a simple structure and is easy to assemble, compact in size, lightweight, reliable in operation, and capable of conveniently and effectively achieving hot plugging.



1. A QSFP module interface device, characterized by comprising: an upper cover, a lower cover, and an elastic arm, wherein two opposite sides of the upper cover are connected to the lower cover at connecting positions, which have first recess portions recessed thereon, the elastic arm is engaged within the first recess portion, and an unlocking device is arranged between the elastic arm and the first recess portion.

2. The QSFP module interface device of claim 1, characterized in that: the elastic arm is L-shaped; the unlocking device includes a second recess portion recessed within the first recess portion and a protrusion disposed on the elastic arm; and the second recess portion and the protrusion engage with each other.

3. The QSFP module interface device of claim 2, characterized in that: the protrusion portion is provided at an end of the elastic arm and includes a first bent portion, a parallel portion connected to the first bent portion and parallel to the elastic arm, a second bent portion connected to the parallel portion, a push block connected to the second bent portion, and a push claw connected to the parallel portion; the push claw and the second bent portion are arranged in parallel at one end of the parallel portion; the second recess portion includes a bottom contact portion, a hollow portion, and a top contact portion; the parallel portion is engaged with the bottom contact portion; the push claw inserts into the hollow portion to engage with the hollow portion; and the push block abuts against the top contact portion.

4. The QSFP module interface device of claim 1, characterized by further comprising: a stopping device, which is disposed at a portion where the first recess portion and the elastic arm are engaged.

5. The QSFP module interface device of claim 4, characterized in that: the stopping device includes a stopping member vertically disposed on the elastic arm and a third recess portion recessed within the first recess portion; and the stopping member is engaged with the third recess portion.

6. The QSFP module interface device of claim 5, characterized in that: the stopping device further includes a fourth recess portion recessed within the first recess portion, a third bent portion connected to the elastic arm, and stopping wings connected to the third bent portion; the stopping wings are disposed on both sides of the stopping member and arranged parallel to the elastic arm; and the stopping wing is engaged with the fourth recess portion.

7. The QSFP module interface device of claim 6, characterized in that: the stopping device further includes a return spring device, which is connected between the stopping member and the third recess portion.

8. The QSFP module interface device of claim 7, characterized in that: the return spring device is a spring, with one end abutting against the stopping member and the other end abutting against the side end of the third recess portion opposite to the stopping member.

9. The QSFP module interface device of any one of claims 1 to 8, characterized by further comprising: a pulling ring connected to the elastic arm, wherein the pulling ring includes a circular

hole, a connecting portion connected to the elastic arm, and a handle portion connected to the circular hole and the connecting portion.

10. The QSFP module interface device of claim 9, characterized in that: the upper cover and the lower cover are connected via hooks and riveted by rivets; the upper cover and the lower cover are respectively provided with arc-shaped portions having the same radius; and the arc-shaped portions cooperate to form a circular portion having an inner side provided with engaging teeth.

QSFP MODULE INTERFACE DEVICE

Technical Field

【0001】 The utility model relates to the field of data transmission and particularly relates to a QSFP module interface device.

Technical Background

【0002】 QSFP is a four-channel SFP interface and developed to meet the market demand for higher-density, high-speed pluggable solutions. This four-channel pluggable interface has a transmission rate of up to 40 Gbps. QSFP and QSFP+ interfaces are mainly used in switches, routers, host adapter buses, enterprise storage, high-density or high-speed I/O, multi-channel interconnections like QSFP, etc. The QSFP interface and plug-in module need to enable flexible plugging and unplugging while ensuring stable connectivity. However, since existing QSFP interfaces often suffer from structural deficiencies, connection failures may occur between optical fibers and PCB board contacts within the interface module after prolonged and repeated plugging and unplugging operations, resulting in unstable data transmission. In addition, the structures of existing QSFP interfaces tend to be overly complex.

Summary of Utility Model

【0003】 The primary objective of the present utility model is to provide a QSFP module interface device, which has a simple structure and is easy to assemble, compact in size, lightweight, reliable in operation, and capable of conveniently and effectively achieving hot plugging.

【0004】 The present utility model provides a QSFP module interface device including: an upper cover, a lower cover, and an elastic arm, wherein two opposite sides of the upper cover are connected to the lower cover at connecting positions, which have first recess portions recessed thereon, the elastic arm is engaged within the first recess portion, and an unlocking device is arranged between the elastic arm and the first recess portion.

【0005】 Preferably, the elastic arm is L-shaped; the unlocking device includes a second recess portion recessed within the first recess portion and a protrusion disposed on the elastic arm; and the second recess portion and the protrusion engage with each other.

【0006】 Preferably, the protrusion portion is provided at an end of the elastic arm and includes a first bent portion, a parallel portion connected to the first bent portion and parallel to the elastic arm, a second bent portion connected to the parallel portion, a push block connected to the second bent portion, and a push claw connected to the parallel portion; the push claw and the second bent portion are arranged in parallel at one end of the parallel portion; the second recess portion includes a bottom contact portion, a hollow portion, and a top contact portion; the parallel portion

is engaged with the bottom contact portion; the push claw inserts into the hollow portion to engage with the hollow portion; and the push block abuts against the top contact portion.

【0007】 Preferably, the QSFP module interface device further includes a stopping device, which is disposed at a portion where the first recess portion and the elastic arm are engaged.

【0008】 Preferably, the stopping device includes a stopping member vertically disposed on the elastic arm and a third recess portion recessed within the first recess portion; and the stopping member is engaged with the third recess portion.

【0009】 Preferably, the stopping device further includes a fourth recess portion recessed within the first recess portion, a third bent portion connected to the elastic arm, and stopping wings connected to the third bent portion; the stopping wings are disposed on both sides of the stopping member and arranged parallel to the elastic arm; and the stopping wing is engaged with the fourth recess portion.

【0010】 Preferably, the stopping device further includes a return spring device, which is connected between the stopping member and the third recess portion.

【0011】 Preferably, the return spring device is a spring, with one end abutting against the stopping member and the other end abutting against the side end of the third recess portion opposite to the stopping member.

【0012】 Preferably, the QSFP module interface device further includes a pulling ring connected to the elastic arm, and the pulling ring includes a circular hole, a connecting portion connected to the elastic arm, and a handle portion connected to the circular hole and the connecting portion.

【0013】 Preferably, the upper cover and the lower cover are connected via hooks and riveted by rivets; the upper cover and the lower cover are respectively provided with arc-shaped portions having the same radius; and the arc-shaped portions cooperate to form a circular portion having an inner side provided with engaging teeth.

【0014】 The present utility model provides a QSFP module interface device including: an upper cover, a lower cover, and an elastic arm, wherein two opposite sides of the upper cover are connected to the lower cover at connecting positions, which have first recess portions recessed thereon, the elastic arm is engaged within the first recess portion, and an unlocking device is arranged between the elastic arm and the first recess portion. The QSFP module interface device has a simple structure and is easy to assemble, compact in size, lightweight, reliable in operation, and capable of conveniently and effectively achieving hot plugging.

Brief Description of the Drawings

【0015】 FIG. 1 is a schematic diagram showing an assembly structure of a QSFP module interface device according to one embodiment of the present utility model.

【0016】 FIG. 2 is a schematic diagram showing a backside of the assembly structure shown in FIG. 1.

【0017】 FIG. 3 is a schematic diagram showing a structure of an elastic arm and a pulling ring of a QSFP module interface device according to one embodiment of the present utility model.

【0018】 FIG. 4 is a schematic diagram showing a structure of an upper cover of a QSFP module interface device according to one embodiment of the present utility model.

【0019】 FIG. 5 is a schematic diagram showing a structure of a lower cover of a QSFP module interface device according to one embodiment of the present utility model.

【0020】 The implementation, functional features, and advantages of the objectives of the present utility model will be further described with reference to the embodiments and accompanying drawings.

Detailed Description of Embodiments

【0021】 The technical solution of the present utility model will be further described below in conjunction with the accompanying drawings and specific embodiments. It should be understood that the specific embodiments described herein are only intended to describe the present utility model and are not intended to limit thereto.

【0022】 Referring to FIG. 1 to FIG. 5, FIG. 1 is a schematic diagram showing an assembly structure of a QSFP module interface device according to one embodiment of the present utility model; FIG. 2 is a schematic diagram showing a backside of the assembly structure shown in FIG. 1; FIG. 3 is a schematic diagram showing a structure of an elastic arm and a pulling ring of a QSFP module interface device according to one embodiment of the present utility model; FIG. 4 is a schematic diagram showing a structure of an upper cover of a QSFP module interface device according to one embodiment of the present utility model; and FIG. 5 is a schematic diagram showing a structure of a lower cover of a QSFP module interface device according to one embodiment of the present utility model. The present utility model provides a QSFP module interface device, including: an upper cover 1, a lower cover 2, and elastic arms 3. The elastic arm 3 is L-shaped. Two opposite sides of the upper cover 1 are connected to the lower cover 2 at connecting positions, and the connecting positions have first recess portions 11 recessed thereon. The elastic arm 3 is engaged with the first recess portion 11 and capable of sliding along a track formed by the first recess portion 11. A transition area where the elastic arm 3 and the lower cover 2 contact each other is provided with an avoidance arc 31. The upper cover 1 and the lower cover

2 are connected via hooks 12, and the hooks 12 positions the upper cover 1 and the lower cover 2. Meanwhile, the upper cover 1 and the lower cover 2 are riveted by rivets 13 to stabilize the connection between the upper cover 1 and the lower cover 2. In addition, the upper cover 1 and the lower cover 2 are respectively provided with arc-shaped portions 14 having the same radius, and the arc-shaped portions 14 cooperate to form a circular portion having an inner side provided with engaging teeth 15. This design allows an optical cable or an electrical cable 7 to be fixed to the QSFP module interface device when the QSFP module interface device is connected to the optical cable or the electrical cable 7.

【0023】 An unlocking device 4 is also provided between the elastic arm 3 and the first recess portion 11. The unlocking device 4 includes a second recess portion 41 recessed within the first recess portion 11 and a protrusion 42 disposed on the elastic arm 3, and the second recess portion 41 and the protrusion 42 engage with each other. The protrusion 42 is provided at the end of the elastic arm 3 and includes a first bent portion 421, a parallel portion 422 connected to the first bent portion 421 and parallel to the elastic arm 3, a second bent portion 423 connected to the parallel portion 422, a push block 424 connected to the second bent portion 423, and a push claw 425 connected to the parallel portion 422. The push claw 425 and the second bent portion 423 are arranged in parallel at one end of the parallel portion 422. The second recess portion 41 includes a bottom contact portion 411, a hollow portion 412, and a top contact portion 413. The parallel portion 422 is engaged with the bottom contact portion 411, the push claw 425 inserts into the hollow portion 412 to engage with the hollow portion 412, and the push block 424 abuts against the top contact portion 413. When the elastic arm 3 is pulled to slide along the first recess portion 11, the protrusion 42 disengages from the second recess portion 41 via the first bent portion 421. Meanwhile, the push claw 425 is pulled out from the hollow portion 412, the push block 424 no longer abuts against the top contact portion 413, the parallel portion 422 makes surface contact with the first recess portion 11 and slides along its track, and the second bent portion 423 pushes away an elastic piece connected to a slot module (not shown) of the QSFP module interface device, allowing the QSFP module interface device to be smoothly unplugged.

【0024】 Further, the QSFP module interface device further includes a stopping device 5, which is disposed at a portion where the first recess portion 11 and the elastic arm 3 are engaged.

【0025】 The stopping device 5 includes a stopping member 51 vertically disposed on the elastic arm 3 and a third recess portion 52 recessed within the first recess portion 11. The stopping member 51 is engaged with the third recess portion 52, and the stopping member 51 is a stopping plate.

【0026】 The stopping device 5 further includes a fourth recess portion 53 recessed within the first recess portion 11, a third bent portion 54 connected to the elastic arm 3, and stopping wings 55 connected to the third bent portion 54. The stopping wings 55 are disposed on both sides of the stopping member 51 and arranged parallel to the elastic arm 3. The stopping wing 55 is engaged with the fourth recess portion 53. After the unlocking device 4 is unlocked, the elastic arm 3 slides along the first recess portion 11 until it reaches the stopping device 5. Meanwhile, the third recess portion 52 forms a block against the side end of the stopping member 51, preventing the stopping member 51 from moving. In addition, the fourth recess portion 53 can also form a block against the side end of the stopping wing 55, preventing the stopping wing 55 from moving. As a result, the stopping process is completed. In this way, when the elastic arm 3 is subjected to a large pulling force, it will not detach from the QSFP module interface device, thereby maintaining the integrity of the entire device.

【0027】 The stopping device 5 further includes a return spring device (not shown), which is connected between the stopping member 51 and the third recess portion 52. The return spring device is a spring, with one end abutting against the stopping member 51 and the other end abutting against the side end of the third recess portion 52 opposite to the stopping member 51. After the unlocking device 4 completes the unlocking operation and makes the QSFP module interface device unplugged from the slot module, the elastic arm 3 has a rebound force under the action of the spring. Driven by the rebound force, the elastic arm 3 slides back along the first recess portion 11, and the protrusion 42 and the second recess portion 41 return to their engaged state, thereby achieving the reset of the QSFP module interface device.

【0028】 Further, the QSFP module interface device also includes a pulling ring 6 connected to the elastic arm 3. The pulling ring 6 includes a circular hole 61, a connecting portion 62 connected to the elastic arm 3, and a handle portion 63 connected to the circular hole 61 and the connecting portion 62. By pulling the pulling ring 6, the elastic arm 3 can be driven to slide along the first recess portion 11, enabling the unlocking device 4 to achieve the unlocking operation.

【0029】 The QSFP module interface device of the present embodiment of the present utility model can realize the unlocking function with the slot module through the unlocking device. At the same time, the stopping device is provided to achieve the stopping function of the QSFP module interface device during the unlocking process. The return spring device achieves the reset of the QSFP module interface device after unlocking. The QSFP module interface device has a simple structure and is easy to assemble, compact in size, lightweight, reliable in operation, and capable of conveniently and effectively achieving hot plugging.

【0030】 The above descriptions are only for preferred embodiments of the present utility model and do not limit the scope of the patent. Any equivalent structure or process transformation based on the contents of the specification and drawings of the present utility model, whether directly or indirectly applied in other related technical fields, shall be included within the protection scope of the utility model patent.

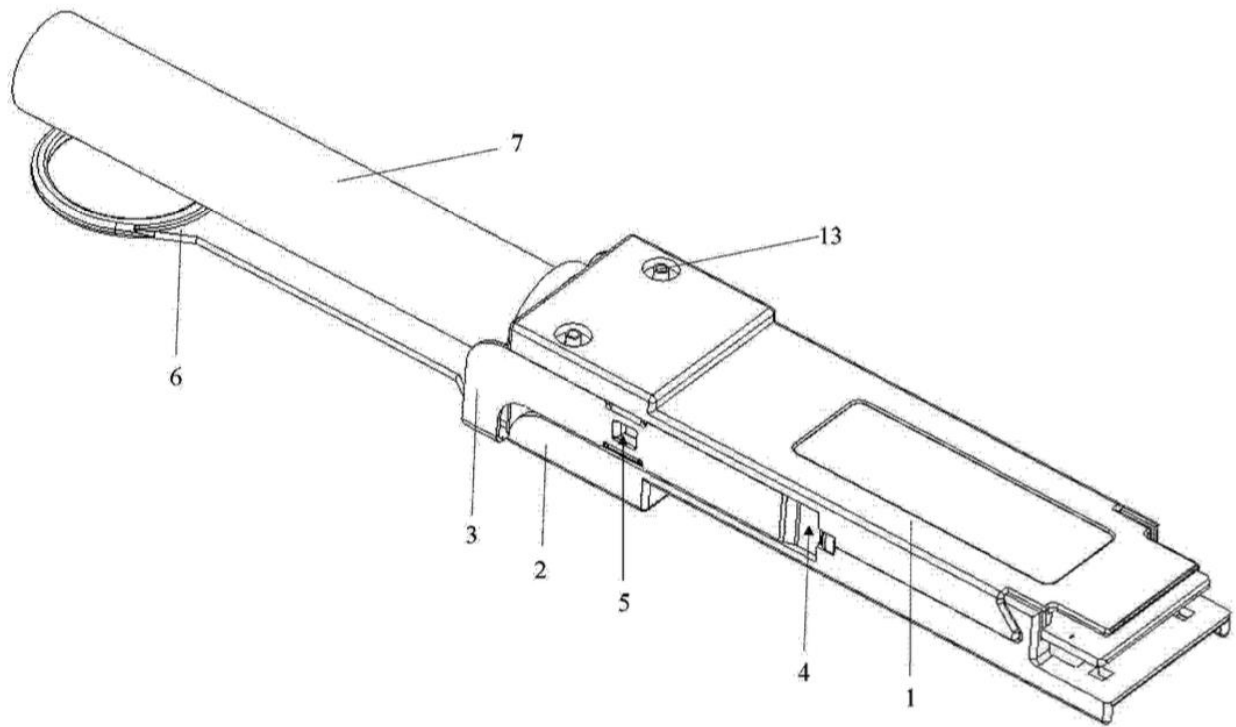


FIG. 1

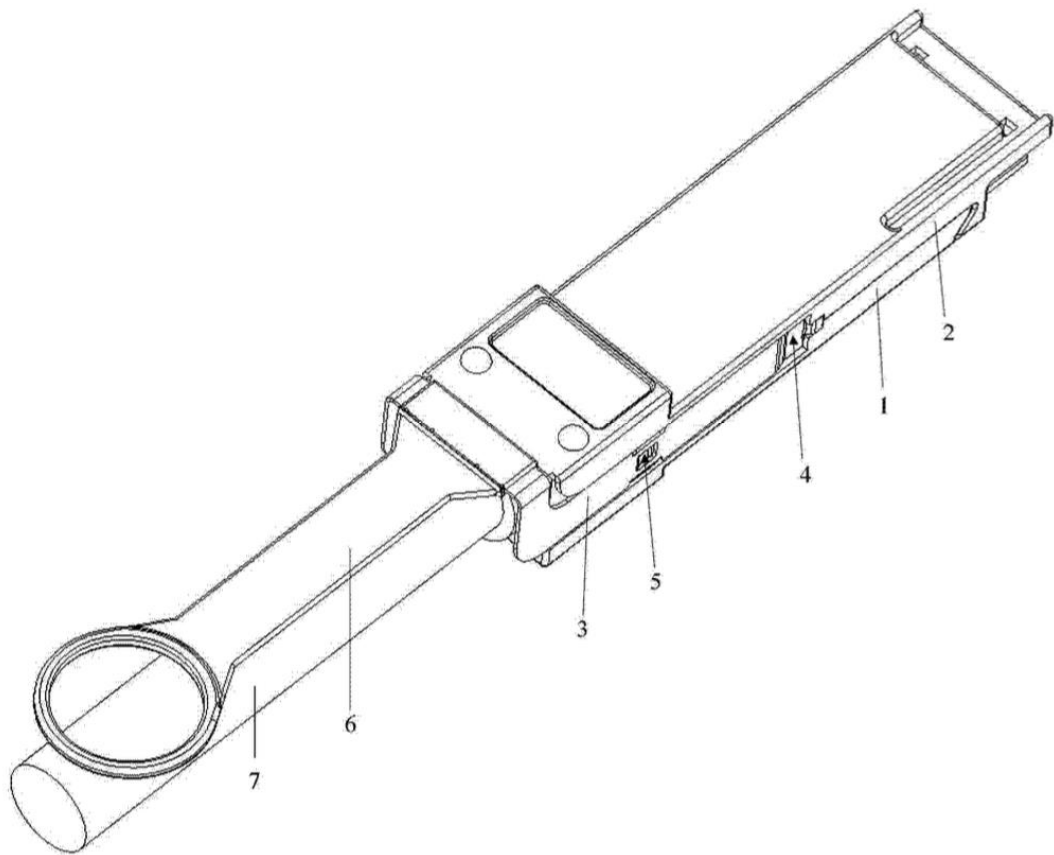


FIG. 2

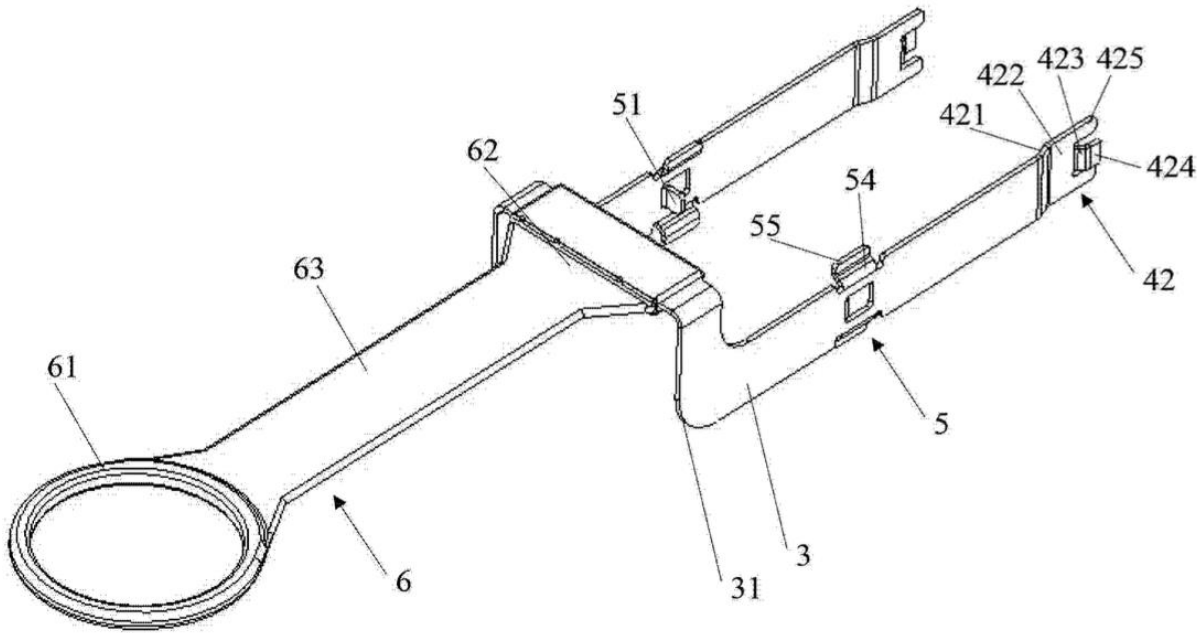


FIG. 3

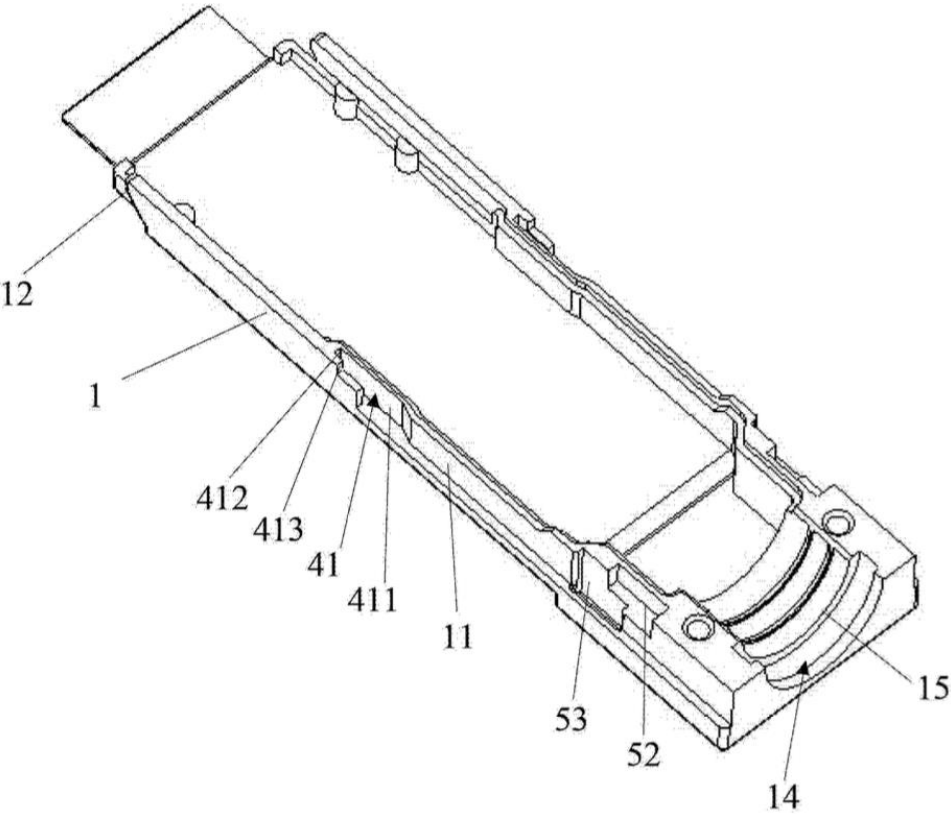


FIG. 4

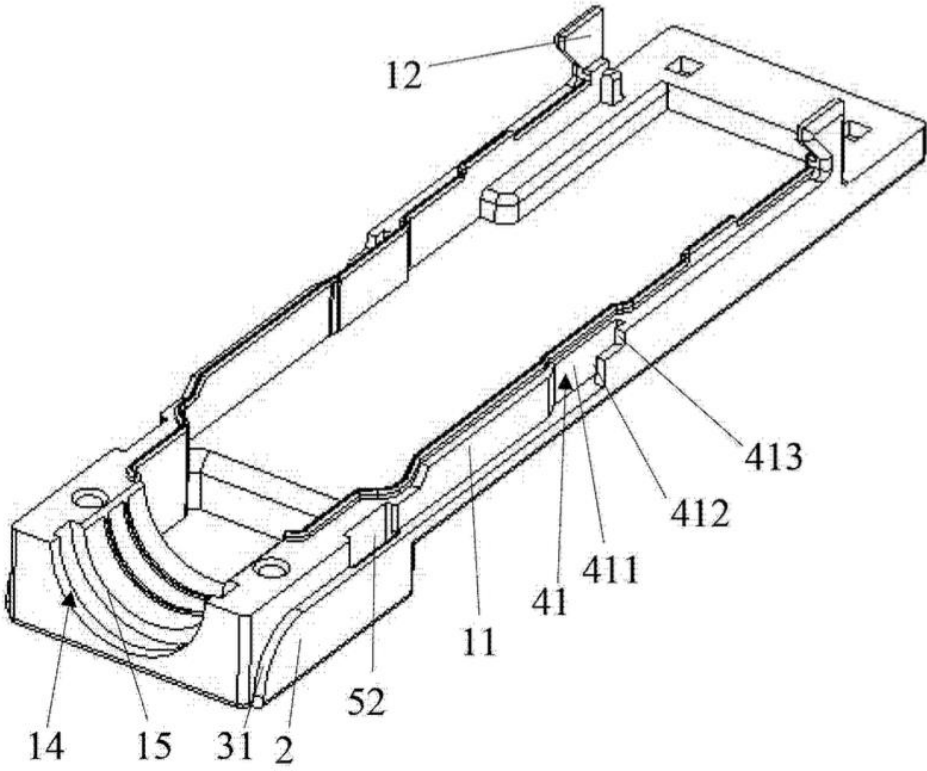


FIG. 5

DECLARATION OF MING-FU TSAI

I, Ming-Fu Tsai, declare as follows:

1. I am above the age of 18 and am currently a translator based in Taiwan.
2. I submit this declaration to certify the accuracy of the English translation of Chian patent No. CN203026708U.
3. I am fluent in both Mandarin Chinese and English. I have personal knowledge of the facts set forth in this declaration and, if called as a witness, could and would testify to those facts.
4. I routinely provide Chinese to English translations of documents as part of my job.
5. I translated the attached "CN203026708U."
6. I certify that the translation of the above-mentioned report was translated by me, and is a true, accurate and complete English translation of the accompanying source document in Mandarin Chinese.

I certify that the foregoing is true and correct.

Dated this 11th day of May, 2025



Ming-Fu Tsai