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Connector structure for secure installation

Abstract

The present disclosure provides a connector structure (10) for secure installation, which is installed on a fixed plate (100) having a through hole (101). The connector structure (10) includes a connector housing (1), two elastic clamping arms (2), and two operable levers (3). The connector housing (1) is inserted through the through hole (101). The two elastic clamping arms (2) are extended from the connector housing (1) and arranged on two opposite sides of the connector housing (1). The two operable levers (3) are pivotally connected to the connector housing (1) and sandwiched between the connector housing (1) and the two elastic clamping arms (2). The two operable levers (3) include two inclined surfaces (31), which gradually increase in thickness (h), in a direction away from the through hole (101).

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Background/Summary

TECHNICAL FIELD

(1) The present disclosure relates to a connector installation structure, and in particular, to a connector structure for secure installation.

DESCRIPTION OF RELATED ART

(2) Connectors such as terminal blocks are used in electronic devices to fix a terminal structure. Terminals are connected to each other or connected to cables, thereby achieving signal transmission or power transmission between different electronic components.

(3) However, related-art connectors are usually mounted on electronic devices by means of screws. During transportation of the electronic device, vibrations of vehicles may easily loosen the screws,

which leads to detachment of the connector from the electronic device. Therefore, how to securely mount the connector on the electronic device is an important research topic in the industry.

(4) In light of the above, the inventor of the present disclosure has devoted himself to doing research and studying scientific principles so as to solve the above problem of related-art techniques.

SUMMARY OF THE DISCLOSURE

(5) The present disclosure provides a connector structure for secure installation. An inclined surface of an operable lever is used to push an elastic clamping arm outward to make the elastic clamping arm be engaged with a fixed plate, so that the connector structure may be securely mounted on the fixed plate.

(6) In one embodiment, the present disclosure provides a connector structure for secure installation, installed on a fixed plate. The fixed plate is provided with a through hole. The connector structure includes: a connector housing inserted through the through hole; two elastic clamping arms extended from the connector housing and arranged on two opposite sides of the connector housing; and two operable levers, each of the two operable levers pivotally connected to the connector housing and sandwiched between the connector housing and a corresponding one of the two elastic clamping arms. The two operable levers include two inclined surfaces such that each of the two operable levers has a bulged portion gradually increase in thickness in a direction away from the through hole and are disposed corresponding to the two elastic clamping arms. When the two operable levers rotate toward the through hole, the two elastic clamping arms are pushed outward by the two inclined surfaces to be engaged with the fixed plate.

(7) Accordingly, when the two operable levers rotate toward the through hole, the two elastic clamping arms are pushed outward by the two inclined surfaces to be engaged with the fixed plate. Therefore, when the connector housing is pushed into the through hole, the two engagement blocks and the fixed plate block each other, thereby preventing the connector housing from retracting into the through hole when the connector housing is pushed. As a result, the connector structure is securely mounted on the fixed plate.

(8) In light of the above, the connector housing includes two U-shaped elastic arms. Each of the U-shaped elastic arms is provided with two pivot holes on inner sides opposite to each other. A pivot shaft protrudes from each of the operable levers and is pivotally connected to the two pivot holes correspondingly. Two ends of the U-shaped elastic arm are flexible, and thus the pivot shaft may be tightly and pivotally connected on the U-shaped elastic arm, and the pivot shaft is not prone to breakage when the operable lever rotates at any angle.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) FIG. 1 is a perspective assembled view of a connector structure of the present disclosure.

(2) FIG. 2 is a perspective exploded view of the connector structure of the present disclosure.

(3) FIG. 3 is a schematic perspective view of an operable lever of the present disclosure.

(4) FIG. 4 is a schematic view of the connector structure in a first in-use state according to the present disclosure.

(5) FIG. 5 is a schematic view of the connector structure in a second in-use state according to the present disclosure.

(6) FIG. 6 is a schematic view of the connector structure in a third in-use state according to the present disclosure.

(7) FIG. 7 is a schematic view of the connector structure in a fourth in-use state according to the present disclosure.

(8) FIG. 8 is a schematic view of the connector structure in a fifth in-use state according to the

present disclosure.

(9) FIG. 9 is an exploded perspective view of the connector structure according to another embodiment of the present disclosure.

DETAILED DESCRIPTION

(10) A detailed description and technical content of the present disclosure are provided below with reference to accompanying drawings. However, the accompanying drawings are only for illustrative purposes and are not intended to limit the present disclosure.

(11) Please refer to FIGS. 1 to 8. The present disclosure provides a connector structure for secure installation. The connector structure is mounted on a fixed plate **100**. The fixed plate **100** may be a casing or a wall of an electronic device. The fixed plate **100** is provided with a through hole **101**. The connector structure **10** mainly includes a connector housing **1**, two elastic clamping arms **2**, and two operable levers **3**.

(12) As shown in FIGS. 1 to 2 and FIGS. 4 to 8, the connector housing **1** is made of an insulating material such as plastic or rubber. A part of the connector housing **1** is inserted through the through hole **101**. The connector housing **1** includes a front side **13** exposed from the through hole **101**. The connector housing **1** includes a plurality of insertion slots **131** defined in the middle of the front side **13** and two recesses **132** defined on left side and right side from the front side **13**.

(13) In addition, a part of the connector housing **1** is inserted through the through hole **101** from the rear of the fixed plate **100**. Two stop blocks **17** are extended from the connector housing **1** and surround the two recesses **132** respectively. Each stop block **17** and the fixed plate **100** block each other to be positioned, so that when the connector housing **1** is pulled toward the front of the fixed plate **100**, the two stop blocks **17** and the fixed plate **100** block each other to prevent the connector housing **1** from being moved out of the through hole **101** from the front of the fixed plate **100**.

(14) As shown in FIGS. 1 to 2 and FIGS. 4, 6, and 8, two elastic clamping arms **2** are extended from the connector housing **1** and arranged on two opposite sides of the connector housing **1**.

(15) In addition, the connector housing **1** includes two U-shaped elastic arms **11** and two toothed blocks **12**. The two U-shaped elastic arms **11** are arranged between the connector housing **1** and one of the two elastic clamping arms **2** respectively, and are arranged above the two elastic clamping arms **2**. The two toothed blocks **12** are arranged between the connector housing **1** and one of the two elastic clamping arms **2** respectively, and are arranged under the two elastic clamping arms **2**. The two U-shaped elastic arms **11** and the two toothed blocks **12** are exposed from the through hole **101**. Each of the U-shaped elastic arms **11** is provided with two pivot holes **111** on inner sides thereof and the two pivot holes **111** are opposite to each other.

(16) Furthermore, each of the U-shaped elastic arms **11** is extended from an upper portion of a corresponding one of the stop blocks **17** in a direction away from a corresponding one of the recesses **132**. Each toothed block **12** is extended from a lower portion of a corresponding one of the stop blocks **17** in a direction away from a corresponding one of the recesses **132**. Therefore, each U-shaped elastic arm **11** and each toothed block **12** are respectively disposed on an upper side and a lower side with respect to a front end of the corresponding recess **132**.

(17) Moreover, the connector housing **1** includes an outer side wall **16** formed on an outer side of each of the recesses **132**. Each of the outer side walls **16** has two linear grooves **161** extended inward from an open end of a corresponding one of the recesses **132**. Each elastic clamping arm **2** includes a linear elastic arm **21** located on the corresponding outer side wall **16** and arranged between the corresponding two linear grooves **161**. Each elastic clamping arm **2** includes an engagement block **22** protruding from an outer side of the corresponding linear elastic arm **21**. Each linear elastic arm **21** is flexible and may be bent relative to the corresponding two linear grooves **161**.

(18) As shown in FIGS. 1 to 8, each of the two operable levers **3** is pivotally connected to the connector housing **1** and sandwiched between the connector housing **1** and one of the two elastic clamping arms **2**. The two operable levers **3** include two inclined surfaces **31** such that each

operable lever **3** has bulged portion gradually increases in thickness *h* in a direction away from the through hole **101**. The two inclined surfaces are disposed corresponding to the two elastic clamping arms **2**.

(19) A detailed description is provided below. A pivot shaft **32** protrudes from each of the operable levers **3**. Two ends of each pivot shaft **32** are pivotally connected to the two pivot holes **111** respectively, so that each operable lever **3** may be received in or released from a corresponding one of the recesses **132**. Each operable lever **3** includes a push block **33** and a fan-shaped block **34** arranged below the push block **33**. Each inclined surface **31** is formed on an outer surface of a corresponding one of the fan-shaped blocks **34**. Each push block **33** is provided with a socket **331** away from a corresponding one of the pivot shafts **32**.

(20) Furthermore, a lower edge of each of the fan-shaped block **34** is provided with a plurality of protruding teeth **341** engaged with a corresponding one of the toothed blocks **12**. A plurality of hollow holes **342** are defined in the outer surface of each of the fan-shaped blocks **34** and adjacent to the corresponding lower edge, so that the lower edge of each of the fan-shaped blocks **34** forms a flexible edge strip **344**.

(21) Please refer to FIGS. **4** to **8**, showing an in-use state of the connector structure **10** of the present disclosure. When the two operable levers **3** rotate toward the through hole **101**, the two elastic clamping arms **2** are pushed outward by the two inclined surfaces **31** and are engaged with the fixed plate **100**. Therefore, when the connector housing **1** is pushed into the through hole **101**, the two engagement blocks **22** and the fixed plate **100** block each other, thereby preventing the connector housing **1** from retracting into the through hole **101** when the connector housing **1** is pushed. Furthermore, the two stop blocks **17** and the fixed plate **100** block each other to prevent the connector housing **1** from coming out of the through hole **101** from the front of the fixed plate **100**, so that the connector structure **10** is securely mounted on the fixed plate **100**.

(22) In addition, the connector housing **1** includes two U-shaped elastic arms **11**. Each of the U-shaped elastic arms **11** is provided with the two pivot holes **111** on the inner sides opposite to each other. Each pivot shaft **32** protrudes from one of the operable levers **3** and is pivotally connected to the two pivot holes **111**. Two ends of the U-shaped elastic arm **11** are flexible, and thus the pivot shaft **32** may be tightly and pivotally connected on the U-shaped elastic arm **11**, and the pivot shaft **32** is not prone to breakage when the operable lever **3** rotates at any angle.

(23) Furthermore, the connector housing **1** includes the two toothed blocks **12**, and each operable lever **3** is provided with the protruding teeth **341** engaged with a corresponding one of the toothed blocks **12**. As a result, when the operable lever **3** rotate toward the through hole **101**, each of the flexible edge strips **344** is slightly deformed under force by means of the hollow holes **342**, so that the protruding teeth **341** are engaged with each toothed block **12** and rotate relative to each toothed block **12**. The engagement between each toothed block **12** and the protruding teeth **341** may provide an engagement feel and enable the operable lever **3** to be positioned through the engagement between the toothed block **12** and the protruding teeth **341**.

(24) Moreover, each operable lever **3** includes the push block **33**. When a user presses the push block **33**, the operable lever **3** is pushed to rotate toward the through hole **101**.

(25) In addition, each push block **33** is provided with the socket **331** away from a corresponding one of the pivot shafts **32**. The user may insert a screwdriver into the socket **331** to press down or pull up the operable lever **3**, so that the operable lever **3** may rotate to move toward or away from the through hole **101**.

(26) Please refer to FIG. **9**, which shows the connector structure **10** according to another embodiment of the present disclosure. The embodiment of FIG. **9** is similar to the embodiment of FIGS. **1** to **8**, and the difference between the two embodiments is that the flexible edge strips **344** have different structures.

(27) In detail, in FIG. **9**, in each of the fan-shaped blocks **34**, a hollow opening **343** is defined in the outer surface and adjacent to the lower edge, so that the lower edge of each of the fan-shaped

blocks **34** forms a flexible edge strip **344**. As a result, when the operable lever **3** rotate toward the through hole **101**. Each flexible edge strip **344** is slightly deformed under force by means of the hollow opening **343**, so that the protruding teeth **341** are engaged with each toothed block **12** and rotate relative to each toothed block **12**. In this way, the present embodiment may achieve the same functions and effects as those of the embodiment shown in FIG. 1 to FIG. 8.

(28) In summary, the connector structure of the present disclosure for secure installation is not disclosed by similar products and in public use.

Claims

1. A connector structure, installed on a fixed plate (**100**), the fixed plate (**100**) comprising a through hole (**101**), the connector structure (**10**) comprising: a connector housing (**1**), inserted through the through hole (**101**); two elastic clamping arms (**2**), extended from the connector housing (**1**) and arranged on two sides of the connector housing (**1**) opposite to each other; and two operable levers (**3**), each of the two operable levers (**3**) pivotally connected to the connector housing (**1**) and sandwiched between the connector housing (**1**) and one of the two elastic clamping arms (**2**) correspondingly, comprising an inclined surface (**31**) such that each of the two operable levers (**3**) has a bulged portion with a thickness (h) gradually increased in a direction away from the through hole (**101**), and the inclined surface (**31**) disposed corresponding to the one of the two elastic clamping arms (**2**); wherein the connector housing (**1**) comprises two U-shaped elastic arms (**11**), each of the two U-shaped elastic arms (**11**) is arranged between the connector housing (**1**) and one of the two elastic clamping arms (**2**) correspondingly and is exposed from the through hole (**101**), and the two operable levers (**3**) are pivotally connected to the two U-shaped elastic arms (**11**) respectively; wherein when the two operable levers (**3**) are configured to rotate toward the through hole (**101**), the two elastic clamping arms (**2**) are pushed outward by two inclined surfaces (**31**) to be engaged with the fixed plate (**100**).

2. The connector structure according to claim 1, wherein each of the U-shaped elastic arms (**11**) comprises two pivot holes (**111**) opposite to each other and disposed inside, each of the operable levers (**3**) comprises a pivot shaft (**32**) disposed protrusively, and two ends of the pivot shaft (**32**) are pivotally connected to the two pivot holes (**111**) respectively.

3. The connector structure according to claim 2, wherein the two U-shaped elastic arms (**11**) are arranged above the two elastic clamping arms (**2**), the connector housing (**1**) comprises two toothed blocks (**12**), each of the two toothed blocks (**12**) is disposed between the connector housing (**1**) and one of the two elastic clamping arms (**2**) and arranged below the one of the two elastic clamping arms (**2**), each of the operable levers (**3**) comprises a push block (**33**) and a fan-shaped block (**34**) arranged below the push block (**33**), the inclined surface (**31**) is located on an outer surface of the fan-shaped block (**34**), and the fan-shaped block (**34**) comprises a plurality of protruding teeth (**341**) disposed on a lower edge thereof and engaged with one of the toothed blocks (**12**).

4. The connector structure according to claim 3, wherein a plurality of hollow holes (**342**) is defined on the outer surface of the fan-shaped block (**34**) and adjacent to the lower edge, and a flexible edge strip (**344**) is disposed on the lower edge of the fan-shaped block (**34**).

5. The connector structure according to claim 3, wherein a hollow opening (**343**) is defined on the outer surface of the fan-shaped block (**34**) and adjacent to the lower edge, and a flexible edge strip (**344**) is disposed on the lower edge of the fan-shaped block (**34**).

6. The connector structure according to claim 3, wherein the connector housing (**1**) comprises a front side (**13**) exposed from the through hole (**101**) and two recesses (**132**) defined on left side and right side from the front side (**13**).

7. The connector structure according to claim 6, wherein the connector housing (**1**) comprises two stop blocks (**17**) extended therefrom and surrounding the two recesses (**132**) respectively, and each stop block (**17**) is blocked by and positioned with the fixed plate (**100**).

8. The connector structure according to claim 7, wherein each of the U-shaped elastic arms (11) is extended from an upper portion of one of the stop blocks (17) in a direction away from one of the recesses (132), each of the toothed blocks (12) is extended from a lower portion of the one of the stop blocks (17) in a direction away from the one of the recesses (132), and each of the operable levers (3) is received in or released from the one of the recesses (132).
9. The connector structure according to claim 6, wherein the connector housing (1) comprises an outer side wall (16) disposed on an outer side of each of the recesses (132), the outer side wall (16) comprises two linear grooves (161) extended inward from an open end of one of the recesses (132), and each elastic clamping arm (2) comprises a linear elastic arm (21) located on the outer side wall (16) and arranged between the two linear grooves (161), and an engagement block (22) disposed protrusively on an outer side of the linear elastic arm (21).
10. The connector structure according to claim 3, wherein the push block (33) comprises a socket (331) disposed away from the pivot shaft (32).
11. The connector structure according to claim 6, wherein a plurality of insertion slots (131) is defined on the front side (13).
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