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Xiao et al.

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(54) **ELECTRICAL CONNECTOR ASSEMBLY**
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H01R 13/10 (2006.01)
H01R 107/00 (2006.01)

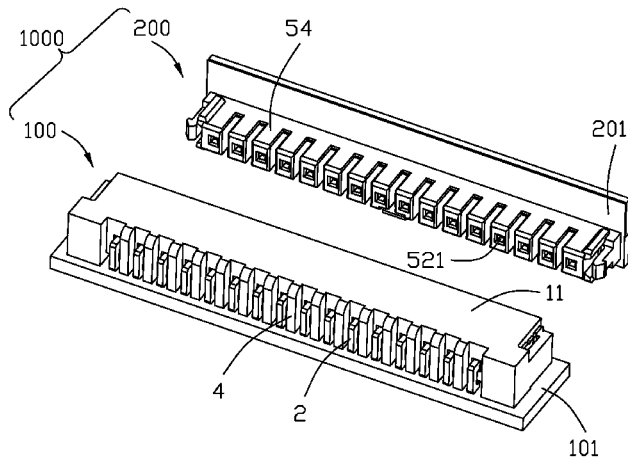
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CPC **H01R 13/6271** (2013.01); **H01R 12/716** (2013.01); **H01R 12/73** (2013.01); (Continued)
(58) **Field of Classification Search**
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(57) **ABSTRACT**
An electrical connector assembly including a first connector and a second connector mated with each other. The first connector includes an insulative housing with a mating cavity sounded by opposite top wall and bottom wall, two opposite side walls and a rear wall. The rear wall forms opposite inner surface and outer surface. A plurality of contacts are retained to the housing and include the contacting sections exposed in the mating cavity and soldering sections exposed outside of the housing and behind the rear wall. A plurality of inner partitions are formed on the interior surface of the rear wall and extend into the mating cavity to separate the contacting sections of the neighboring contacts, respectively. A plurality of outer partitions are formed on the exterior surface of the rear wall to separate the soldering sections of the neighboring contacts.

20 Claims, 17 Drawing Sheets



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(58)	Field of Classification Search CPC H01R 12/716; H01R 12/73; H01R 13/514; H01R 13/04; H01R 13/10; H01R 2107/00 See application file for complete search history.	
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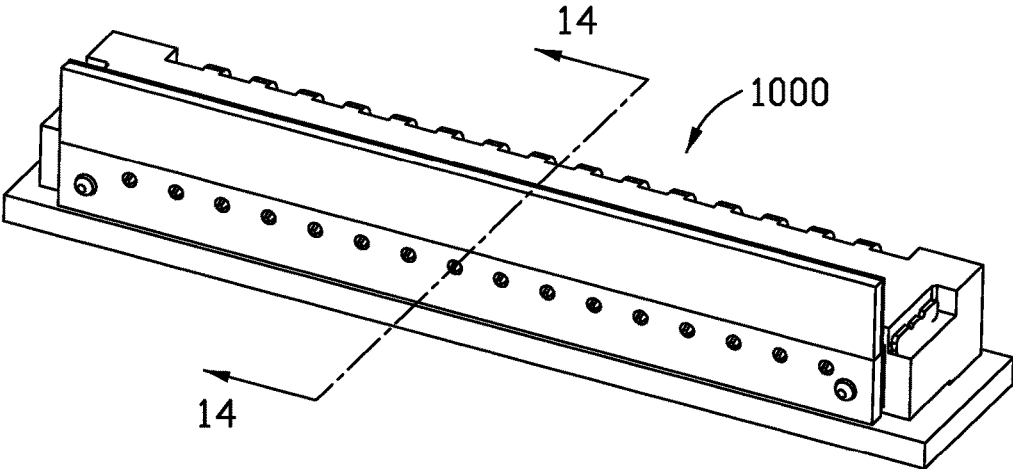


FIG. 1

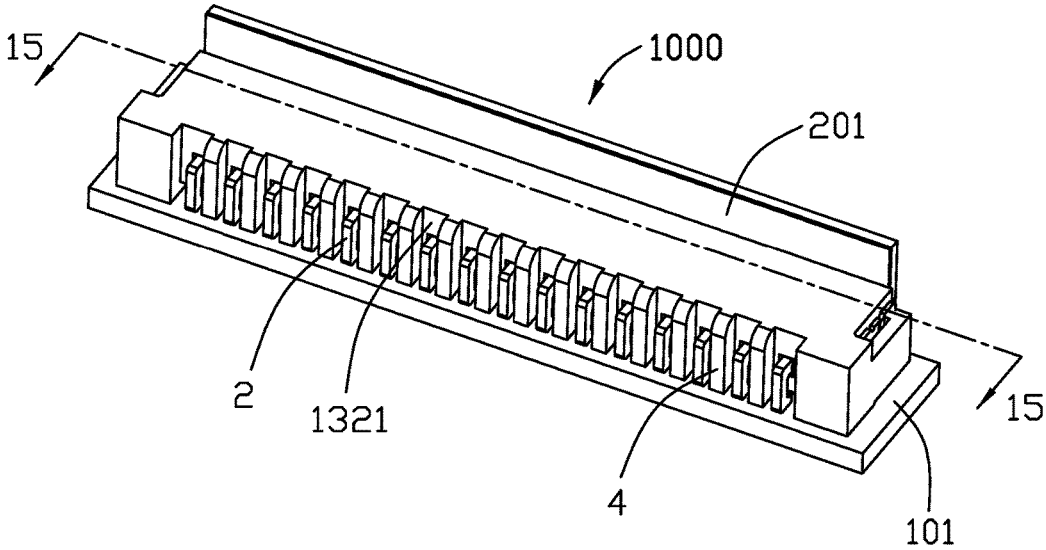


FIG. 2

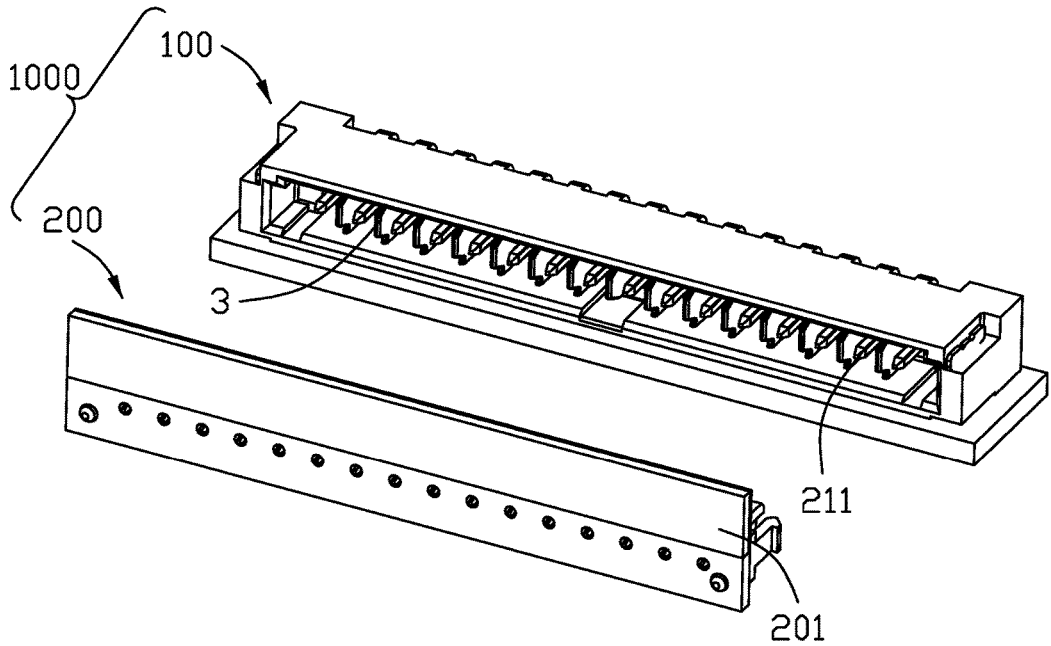


FIG. 3

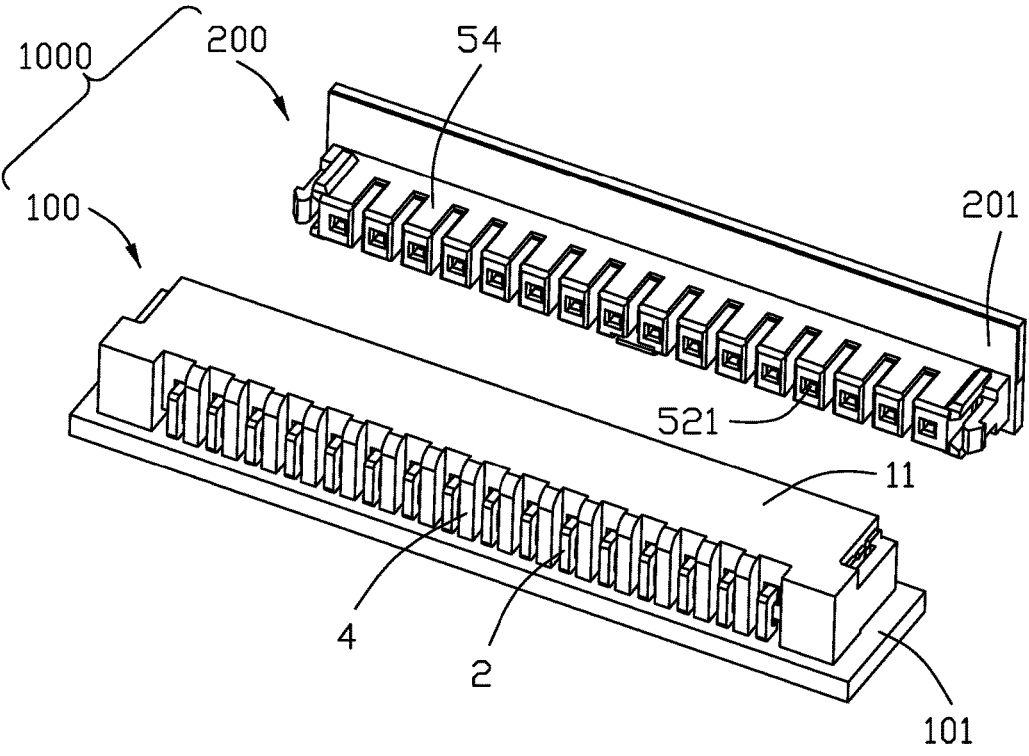


FIG. 4

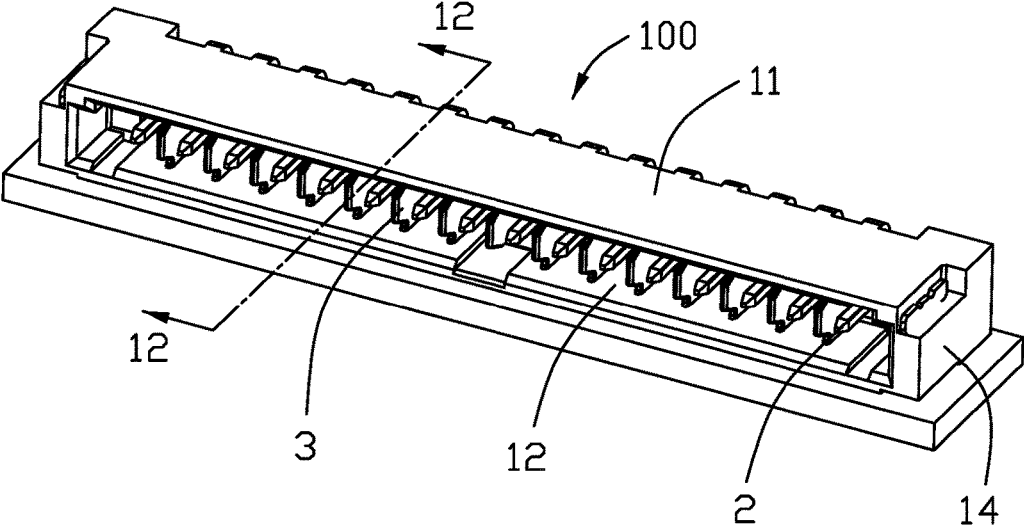


FIG. 5

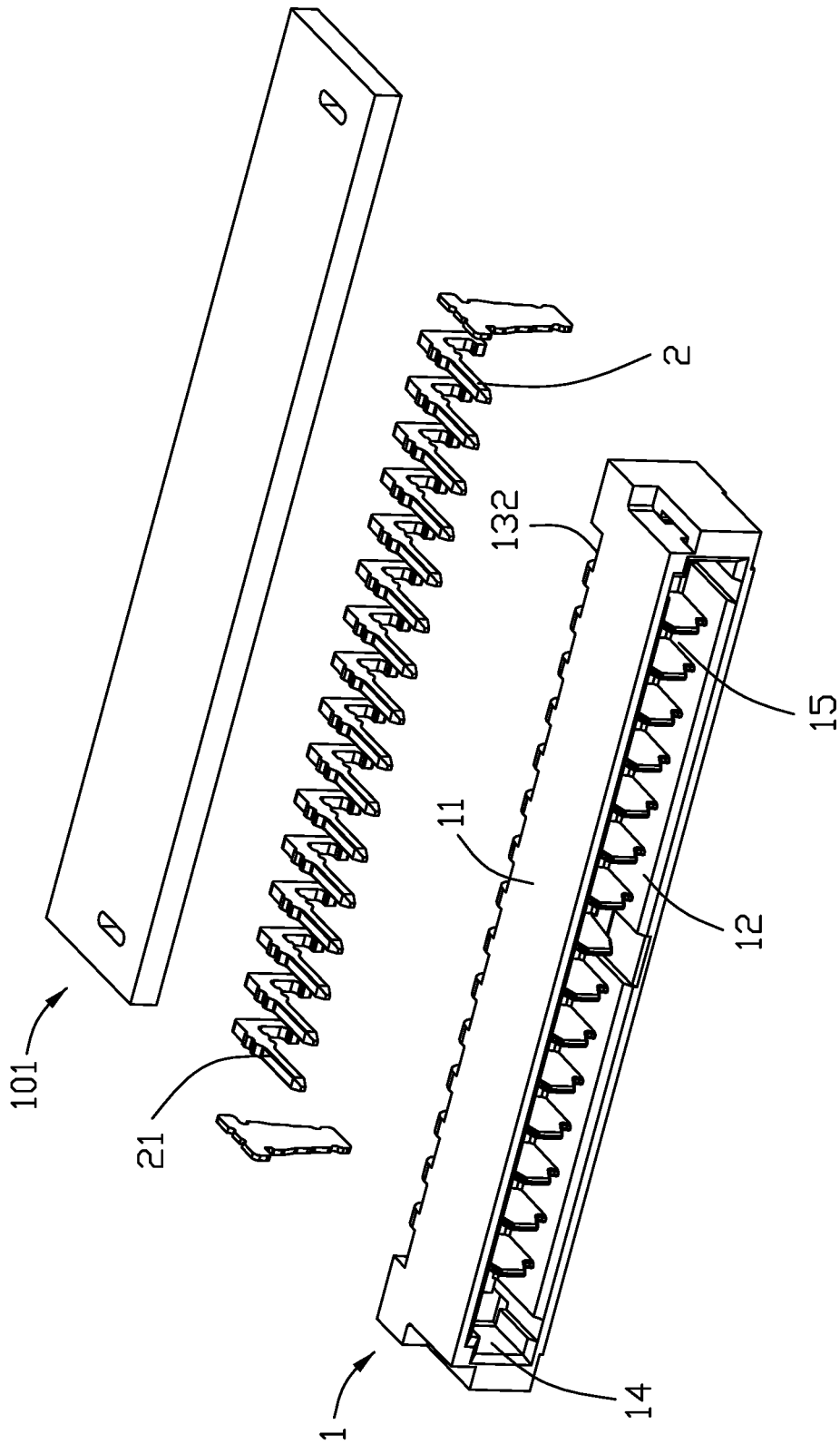


FIG. 6

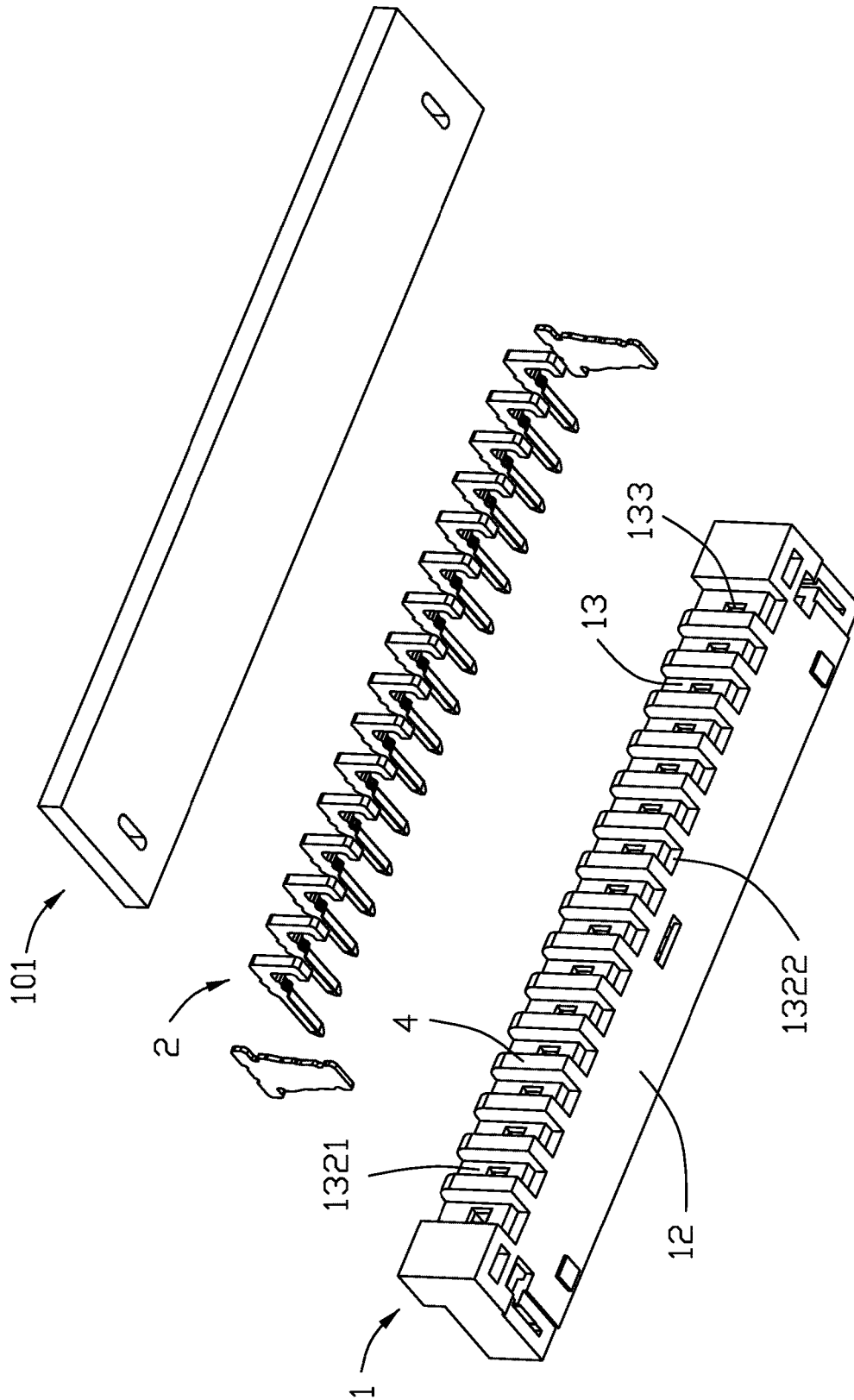


FIG. 7

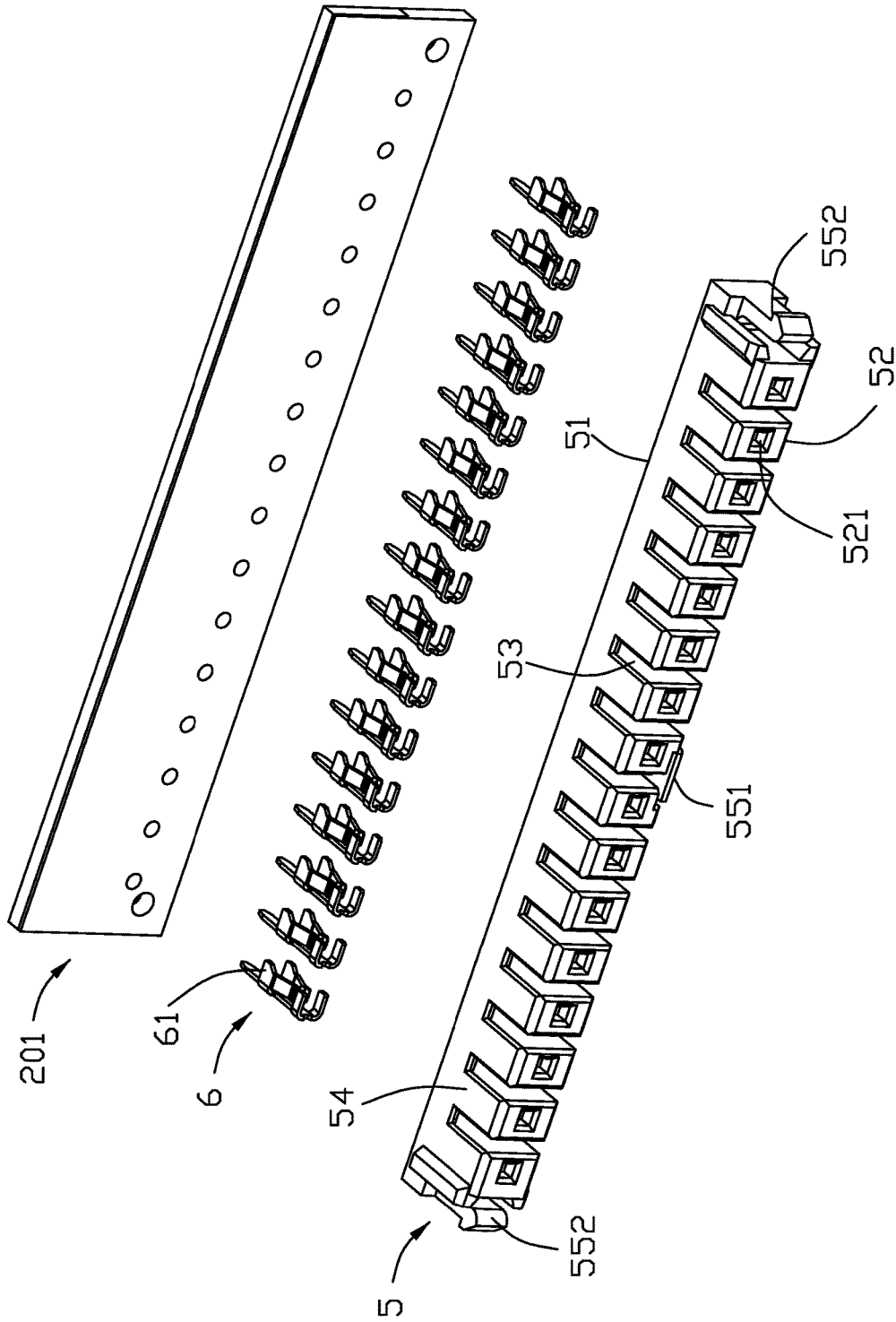


FIG. 8

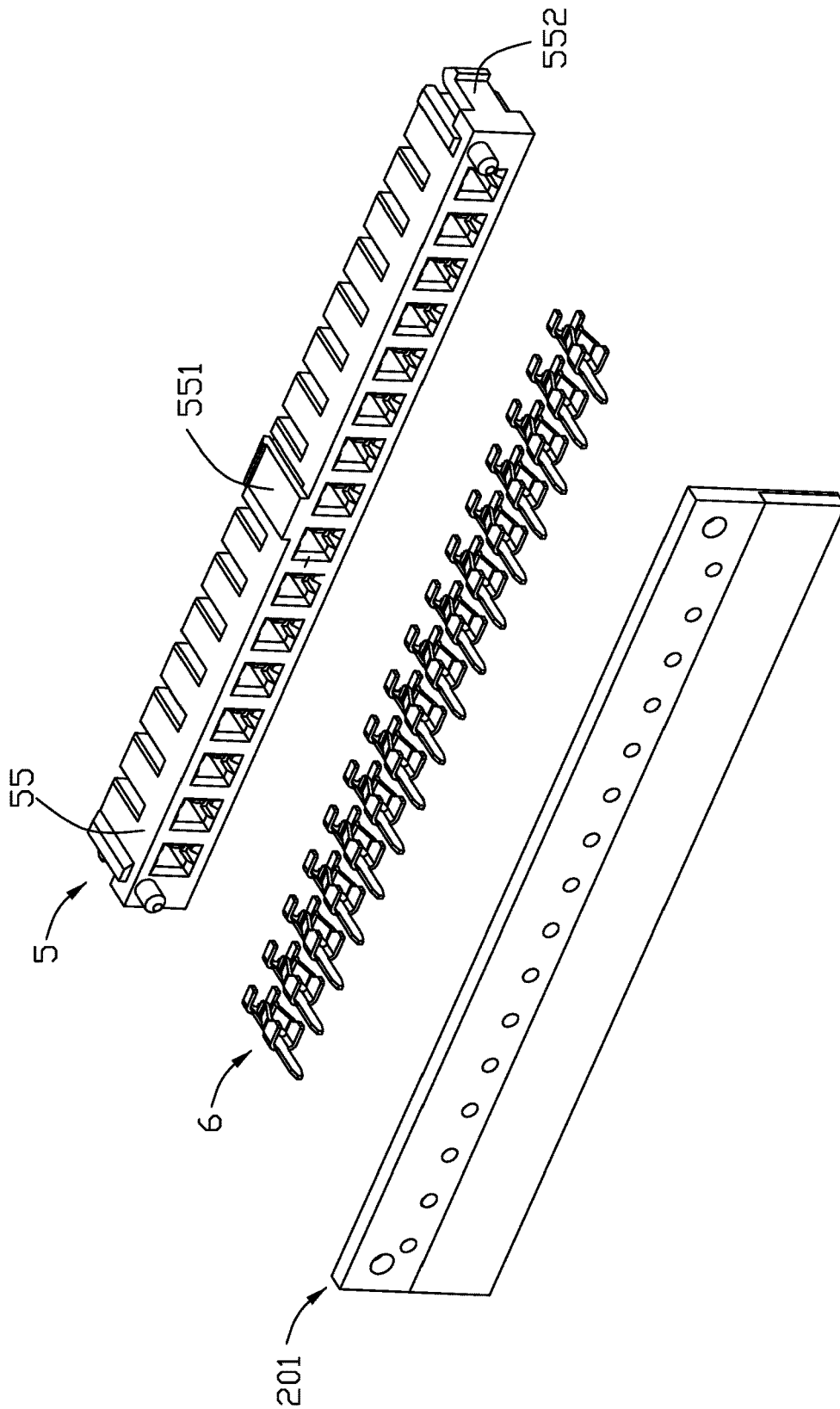


FIG. 9

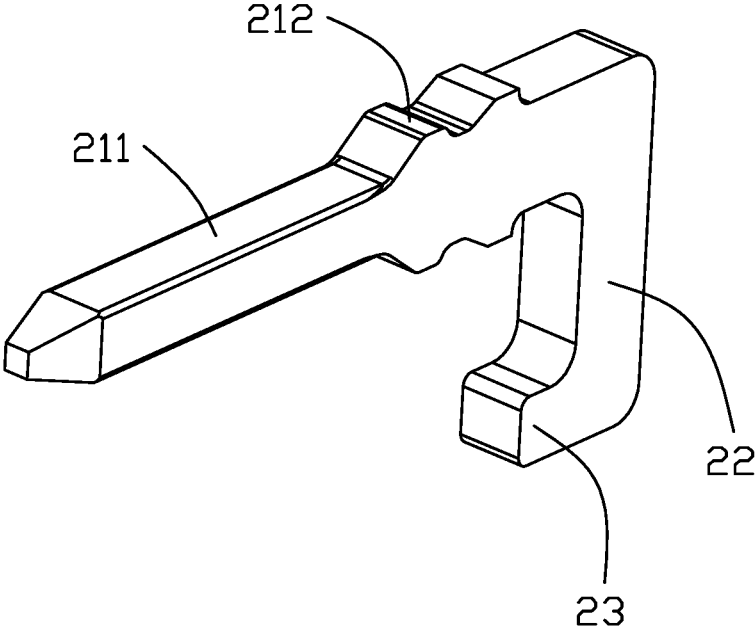


FIG. 10

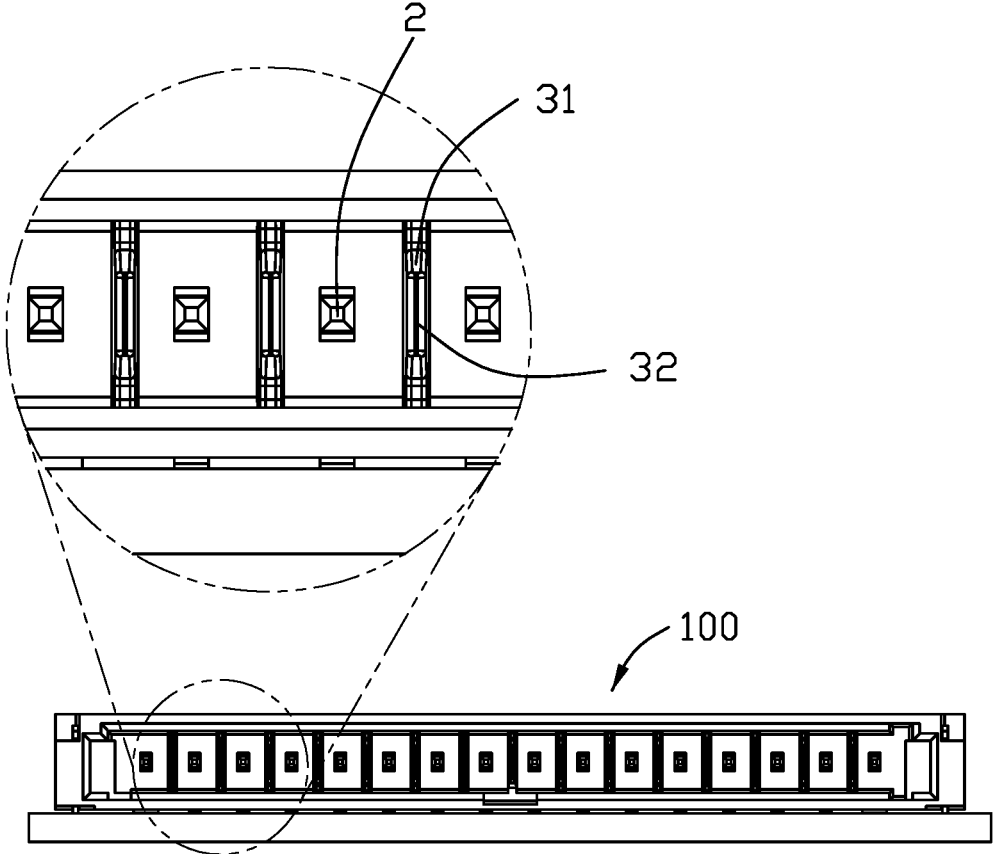


FIG. 11

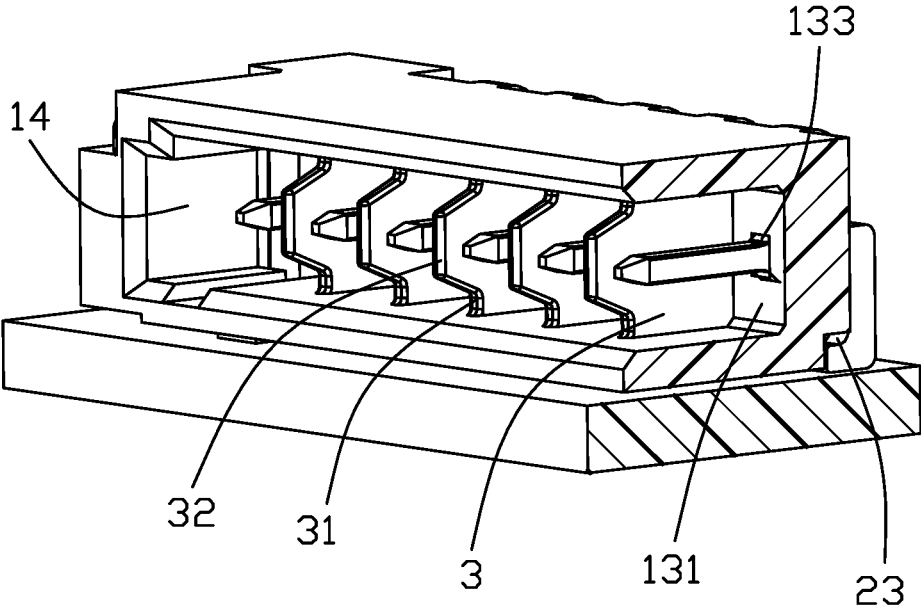


FIG. 12

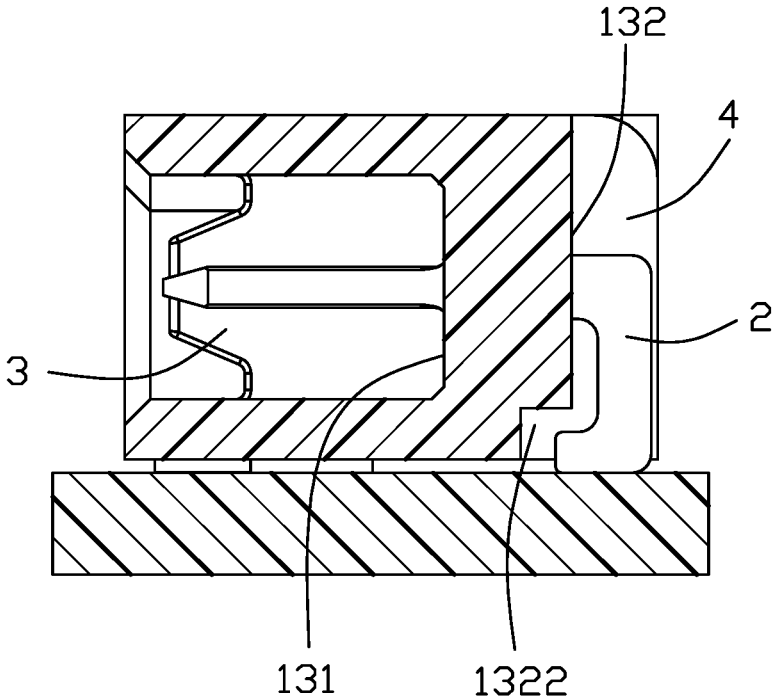


FIG. 13

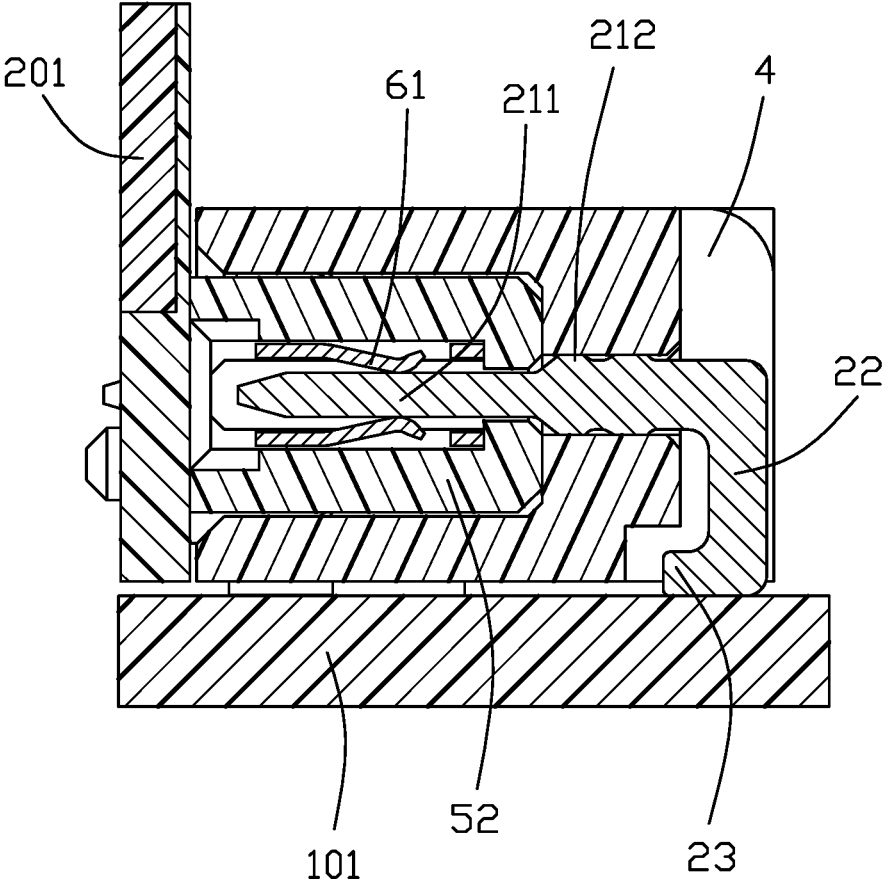


FIG. 14

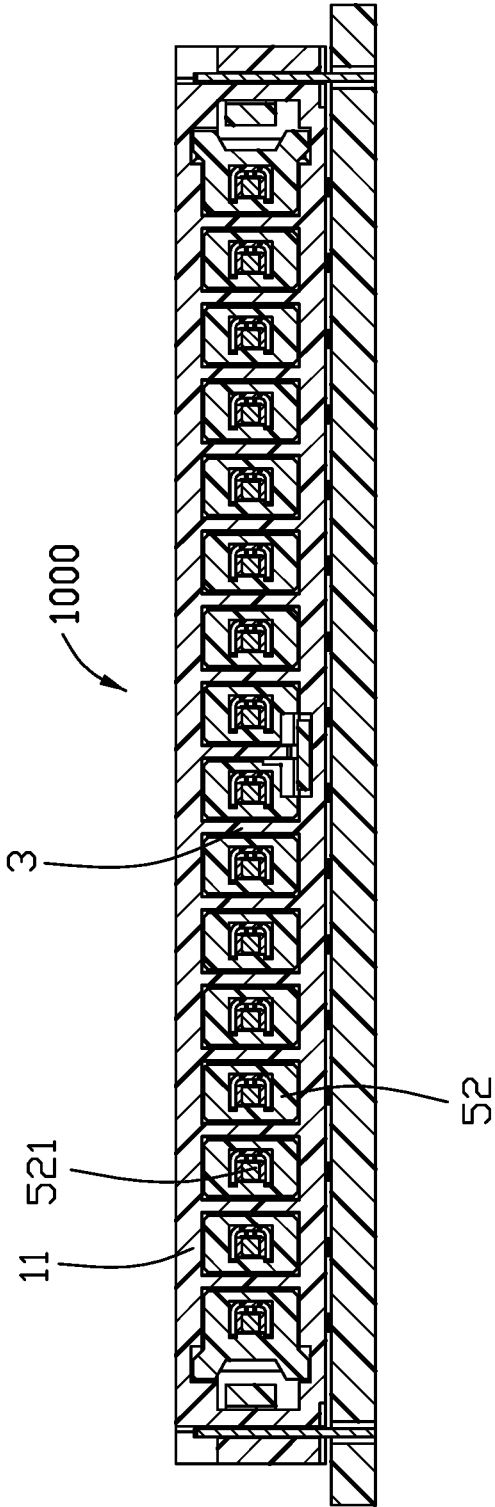


FIG. 15

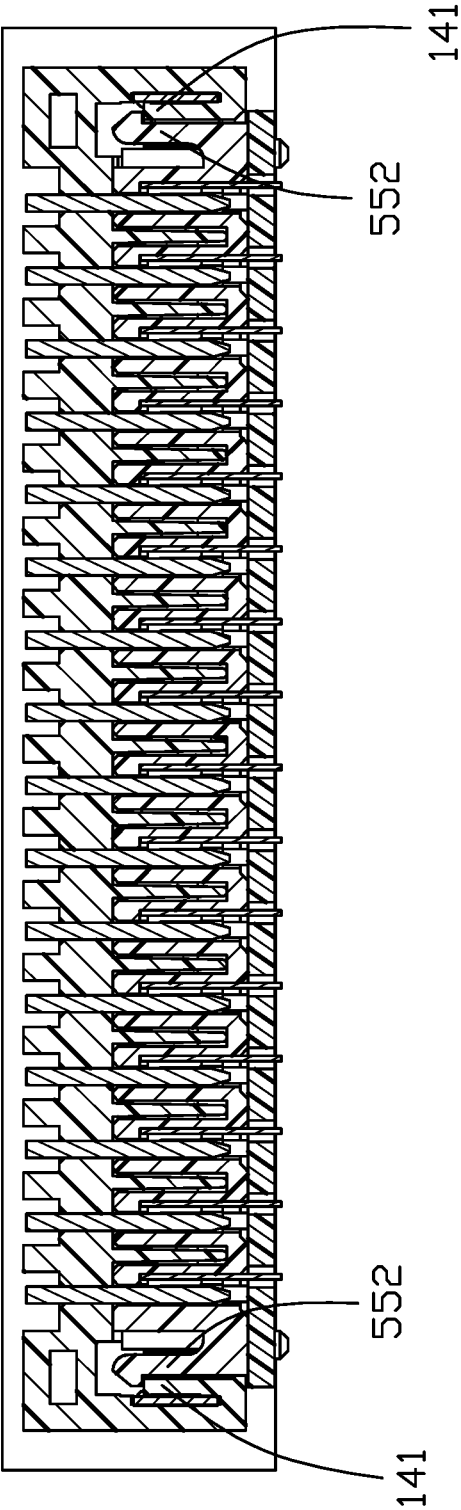


FIG. 16

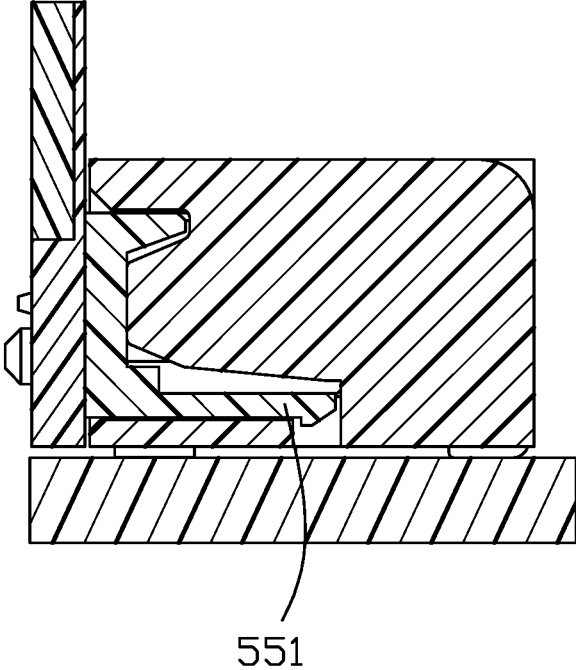


FIG. 17

ELECTRICAL CONNECTOR ASSEMBLY

1. FIELD OF THE DISCLOSURE

The invention is related to an electrical connector assembly, and particularly to an electrical connector assembly with latches and partitions.

2. DESCRIPTION OF RELATED ARTS

U.S. Pat. No. 8,043,127 discloses the electrical connector assembly with mated connectors wherein the neighboring contacts lack proper partitions for separation therebetween. On the other hand the latching mechanism between the coupled connectors is applied to only one side thereof, thus tending unstable.

Therefore, it is desired to have an electrical connector equipped with the partitions to separate the neighboring contacts.

SUMMARY OF THE DISCLOSURE

To achieve the aforementioned object, an electrical connector assembly including a first connector and a second connector mated with each other. The first connector is of a header type and the second connector is of a silo type. The first connector includes an insulative housing with a mating cavity sounded by opposite top wall and bottom wall, two opposite side walls and a rear wall. The rear wall forms opposite inner surface and outer surface. A plurality of pin type contacts are retained to the housing and include the contacting sections exposed in the mating cavity and soldering sections exposed outside of the housing and behind the rear wall. A plurality of inner partitions are formed on the interior surface of the rear wall and extend into the mating cavity to separate the contacting sections of the neighboring contacts, respectively. A plurality of outer partitions are formed on the exterior surface of the rear wall to separate the soldering sections of the neighboring contacts. Correspondingly, the second connector includes an insulative housing with a plurality of silos separated by grooves, and a plurality of resilient contacts disposed in the corresponding silos, respectively. During mating, the partitions of the first connector are respectively received within the corresponding partition grooves of the second connector, and the pin type contacts of the first connector are inserted into the corresponding silos and mated with the corresponding resilient contacts of the second connector, respectively. The housing of the second connector further includes three sided latches to be locked to the housing of the first connector.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the electrical connector assembly with the first connector and the second connector mated together according to the invention;

FIG. 2 is another perspective view of the electrical connector assembly of FIG. 1;

FIG. 3 is a perspective view of the electrical connector assembly of FIG. 1 with the first connector and the second connector are separate from each other;

FIG. 4 is another perspective view of the electrical connector of FIG. 3;

FIG. 5 is a perspective view of the first connector of the electrical connector assembly of FIG. 3;

FIG. 6 is an exploded perspective view of the first connector of the electrical connector assembly of FIG. 5;

FIG. 7 is another exploded perspective view of the first connector of the electrical connector assembly of FIG. 6;

FIG. 8 is an exploded perspective view of the second connector of the electrical connector assembly of FIG. 3;

FIG. 9 is another exploded perspective view of the second connector of the electrical connector assembly of FIG. 8;

FIG. 10 is a perspective view of the contact of the first connector of the electrical connector assembly of FIG. 5

FIG. 11 is a front elevational view of the first connector of the electrical connector assembly of FIG. 5;

FIG. 12 is a cut-off perspective view of the first connector of the electrical connector of FIG. 5;

FIG. 13 is a cross-sectional view of the first connector of the electrical connector of FIG. 5;

FIG. 14 is a cross-sectional view of the electrical connector assembly of FIG. 1 to show how the contact of the first connector and the contact of the second connector are mated with each other;

FIG. 15 is another cross-sectional view of the electrical connector assembly of FIG. 1 to show the contact of the first connector and the contact of the second connector are mated with each other;

FIG. 16 is another cross-sectional view of the electrical connector assembly of FIG. 1 to show how the first connector and the second connector are latched with each other at the opposite ends; and

FIG. 17 is another cross-sectional view of the electrical connector assembly of FIG. 1 to show how the first connector and the second connector are latched with each other at the center region.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference will now be made in detail to the embodiments of the present disclosure. The electrical connector assembly **1000** includes a first connector **100** mounted to the first printed circuit board **101**, and is adapted to be mated with a second connector **200** mounted upon a second printed circuit board **201**. The first connector **100** includes an first insulative housing **1** and a plurality of first contacts **2** retained in the first housing **1**. Correspondingly, the second connector **200** includes an second insulative housing **5** and a plurality of second contacts **6** retained in the second housing **5**.

The first housing **1** includes opposite top wall **11** and bottom wall **12**, a rear wall **13** connected between the top wall **11** and the bottom wall **12**, and a pair of end walls **14** linked among the top wall **11**, the bottom wall **12** and the rear wall **13** to commonly form a mating cavity **15**. The rear wall **13** includes opposite interior surface **131** and exterior surface **132**, and a plurality of passageways **133** extending therethrough. A plurality of grooves **1321** and a plurality of tail grooves **1322** are formed in the exterior surface **132** by the corresponding outer partitions **4** which extend rearwardly from the exterior surface **132** wherein the tail grooves **1322** are communicatively located under the corresponding grooves **1321**, respectively. The passageways **133** are communicatively located at a mid-level of the corresponding grooves **1321**, respectively. A plurality of inner partitions **3** are formed on the interior surface **131** and extend into the mating cavity **15** from the top wall **11** to the bottom wall **12**. The inner partition **3** includes two opposite recesses **31** and a head **32** therebetween in the vertical direction wherein the one recess is joined to the top wall **11** and the other recess is joined to the bottom wall **12**. The inner partitions **3** and the outer partitions **4** are aligned with each other in a front-to-back direction, respectively, while

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the outer partitions 4 are wider than the corresponding inner partitions 3, respectively, in the longitudinal direction of the electrical connector assembly 1000.

The first contact 2 is made by stamping and of a pin type, and includes a horizontal section 21, a vertical section 22 extending downwardly from the rear end of the horizontal section 21, and a soldering section 23 extending forwardly from the bottom end of the vertical section 22 so that both the horizontal section 21 and the soldering section 23 are located on a same side of the vertical section 22. The horizontal section 21 includes a pin type contacting section 211 and two pairs of barbs 212. Notably, the soldering section 23 is essentially located behind the barbs 212 in the front-to-back direction. The contacting section 211 extends through the passageway 133 and into the mating cavity 15. The barbs 212 are retained to the rear wall 13. The vertical section 22 is located in the corresponding groove 1321. The soldering section 23 is exposed outside of the exterior surface 132 while still within the corresponding tail groove 1322. In brief, the contacting section 211 is protectively located between the pair of inner partitions 3 by two sides and the soldering section 23 is protectively located between the pair of outer partitions 4 by two sides.

The second housing 5 of the second connector 200 includes a base 51 and a plurality of silos 52 extending from the base 51 and alternately arranged with the partition grooves 53 along the longitudinal direction of the base 51. Each silo 52 forms a hole 521 to receive a second contact 6. The base 51 includes opposite top face 54 and bottom face 55, and the partition grooves 53 extend through both the top face 51 and the bottom face 52 and the front face (not labeled) of the second housing 5. The housing 5 further includes a deflectable latch 551 adapted to be moved along the channel 121 in the bottom wall 12 of the first housing 1 for locking the first housing 1 and the second housing 2 together. Similarly, the housing 5 further includes a pair of deflectable latches 552 at two opposite longitudinal ends adapted to be engaged with corresponding steps 141 of the first housing 1 during mating. Notably, the three sided latching, i.e., the latch 551 and the pair of latches 552, may provide reliable securing between the first connector 100 and the second connector 200. The second contact 6 includes the clamping arm 61 disposed in the hole 521. During mating, the inner partitions 3 are respectively received in the corresponding partition grooves 53, and the contacting section 211 of the first contacts 2 are gripped by the clamping arms 61 of the second contacts 6.

While a preferred embodiment according to the present disclosure has been shown and described, equivalent modifications and changes known to persons skilled in the art according to the spirit of the present disclosure are considered within the scope of the present disclosure as described in the appended claims.

What is claimed is:

1. An electrical connector assembly comprising:
a first connector and a second connector adapted to be mounted to respective printed circuit boards and mated with each other,
said first connector including a first insulative housing and a plurality of first contacts retained in the first insulative housing,
the first insulative housing including opposite top wall and bottom wall in a vertical direction wherein the bottom wall is adapted to be mounted to the corresponding printed circuit board, a pair of end walls along a longitudinal direction perpendicular to said vertical direction, and a rear wall in a front-to-back direction

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perpendicular to both said vertical direction and said longitudinal direction to commonly form a mating cavity forwardly communicating with an exterior in said front-to-back direction;

said second connector including a second insulative housing adapted to be received in the mating cavity, and a plurality of second contacts retained in the second insulative housing; wherein

a first deflectable latch is located at a middle region of the second insulative housing, and a pair of second deflectable latches are located at two opposite ends of the second insulative housing in said longitudinal direction; wherein

during mating, the first deflectable latch of the second connector is received in the mating cavity around the bottom wall of the first connector in a substantially fully hidden manner.

2. The electrical connector assembly as claimed in claim 1, wherein the second insulative housing includes a plurality of silos to respectively receive the corresponding second contacts, and further receive the corresponding first contacts during mating.

3. The electrical connector assembly as claimed in claim 2, wherein each of said first contacts includes a front contacting section exposed within the mating cavity, and a vertical section exposed around the rear wall, and the first insulative housing forms a plurality of inner partitions extending forwardly from the rear wall to separate the corresponding contacting sections and a plurality of outer partitions extending rearwardly from the rear wall to form corresponding grooves between every adjacent two outer partitions to receive the vertical sections, respectively.

4. The electrical connector assembly as claimed in claim 3, wherein the second insulative housing forms a plurality of partition grooves between every adjacent two silos to receive the corresponding inner partitions of the first insulative housing, respectively, during mating.

5. The electrical connector assembly as claimed in claim 4, wherein each of the first contacts further including a soldering section forwardly extending from a bottom end of the vertical section.

6. The electrical connector assembly as claimed in claim 5, wherein in each of said first contacts, the soldering section and the contacting section are located on a same side with regard to the rear wall.

7. The electrical connector assembly as claimed in claim 6, wherein said first insulative housing further includes a plurality of tail grooves communicatively below the corresponding grooves to receive the corresponding soldering section.

8. An electrical connector assembly comprising:
a first connector and a second connector configured to be mated with each other,

said first connector including first insulative housing and a plurality of first contacts retained in the first insulative housing;

the first insulative housing including opposite top wall and bottom wall in a vertical direction, a pair of end walls along a longitudinal direction perpendicular to said vertical direction, and a rear wall in a front-to-back direction perpendicular to both said vertical direction and said longitudinal direction to commonly form a mating cavity forwardly communicating with an exterior in said front-to-back direction; and

each of said first contacts including a front contacting section exposed in the mating cavity, and a rear vertical

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section exposed around the rear wall, and a soldering section extending from a bottom end of the vertical section; wherein

the first housing forms a plurality of inner partitions in the mating cavity to separate the corresponding contacting sections, respectively, and a plurality of outer partitions behind the rear wall to form corresponding grooves in which the corresponding vertical sections are received, respectively; wherein

each of said outer partitions is dimensioned to be substantially larger than the vertical section of the neighboring contact in both the vertical direction and the front-to-back direction for efficient shielding in the longitudinal direction.

9. The electrical connector assembly as claimed 8, wherein the inner partitions unitarily extend forwardly from the rear wall, and the outer partitions unitarily extend rearwardly from the rear wall.

10. The electrical connector assembly as claimed in claim 9, wherein said inner partitions are further linked to both the top wall and the bottom wall.

11. The electrical connector assembly as claimed in claim 9, wherein the rear wall further forms a plurality of tail grooves communicatively below the corresponding grooves to receive the corresponding soldering sections which extend forwardly from the corresponding vertical sections in the front-to-back direction, respectively.

12. The electrical connector assembly as claimed in claim 8, wherein the second insulative housing includes a plurality of silos to respectively receive the corresponding second contacts, and further receive the corresponding first contacts during mating.

13. The electrical connector assembly as claimed in claim 12, wherein the second insulative housing forms a plurality of partition grooves between every adjacent two silos to receive the corresponding inner partitions of the first insulative housing, respectively, during mating.

14. The electrical connector assembly as claimed in claim 1, wherein during mating, the pair of second deflectable latches of the second connector are received in the mating cavity of the first connector in a fully hidden manner.

15. A electrical connector for use with another connector having a plurality of silos receiving corresponding terminals therein and forming corresponding partition grooves therebetween, comprising:

an insulative housing including opposite top wall and bottom wall in a vertical direction, a pair of end walls along a longitudinal direction perpendicular to said

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vertical direction, and a rear wall in a front-to-back direction perpendicular to both said vertical direction and said longitudinal direction to commonly form a mating cavity forwardly communicating with an exterior in said front-to-back direction; and

a plurality of contacts retained to the housing, each of said contacts including a vertical section located behind the rear wall, a horizontal section extending forwardly from an upper side of the vertical section and having a barbs retained to the rear wall and a contacting section exposed in the mating cavity, and a soldering section extending forwardly from a bottom side of the vertical section; wherein

said housing further includes a plurality inner partitions in the mating cavity to separate the contacting sections and be adapted to be received within the partition grooves, and a plurality of outer partitions behind the rear wall to separate the vertical sections; wherein

a plurality of grooves are formed between the corresponding outer partitions to respectively receive the corresponding vertical sections, and a plurality of tail grooves are formed below the rear wall and communicatively aligned with the corresponding grooves to receive the corresponding soldering sections, respectively.

16. The electrical connector as claimed in claim 15, wherein each of said inner partitions unitarily extends forwardly from the rear wall.

17. The electrical connector as claimed in claim 16, wherein each of said inner partitions is further linked to both the top wall and the bottom wall.

18. The electrical connector as claimed in claim 17, wherein a pair of recesses are formed in a front edge of each of the inner partitions.

19. The electrical connector assembly as claim 15, wherein a step is formed at each end wall for engagement with a corresponding latch of said another connector in a fully hidden manner during mating.

20. The electrical connector assembly as claimed in claim 15, wherein each of said outer partitions is dimensioned to be substantially larger than the vertical section of the neighboring contact in both the vertical direction and the front-to-back direction for efficient shielding in the longitudinal direction.

* * * * *