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ELECTRICAL CONNECTOR AND ELECTRICAL CONNECTOR ASSEMBLY**RELATED APPLICATIONS**

[0001] This application claims priority to Taiwanese Application No. 105113237, filed April 28, 2016, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to an electrical connector and an electrical connector assembly, particularly relates to an electrical connector for connecting two circuit boards and having a slot and an electrical connector assembly assembled by the previous electrical connector and two circuit boards.

BACKGROUND ART

[0003] Electrical connectors are widely used in electronic products and transmit electrical signals in the electronic product via a conductive terminal. FIG. 1 is a perspective view of a known electrical connector system 1, and is disclosed in Chinese patent CN102176552 . Referring to FIG. 1, the electrical connector system 1 comprises a first connector 10, a second connector 12 and an adapter 14. The first connector 10 is connected to a first side of the adapter 14 and is mounted on a first board 16. The second connector 12 is mounted on a second board 18 and is connected to a second side of the adapter 14. A structure of the electrical connector system 1 resolves the problem of heat dissipation by means of making the first board 18 perpendicular to the second board 16. However, in this structure, at least two connectors (the first connector 10 and the second connector 12) must be used. In this way, it increases transmission path and the number of terminal contact points, and potentially has a negative effect on signal transmission rate. Also, impedance is increased due to the increased number, power consumption is increased and excessive heat may be generated. In such a case, an additional cooling system may be required to cool the electrical connector system 1, which will increase the cost.

SUMMARY OF THE INVENTION

[0004] In an embodiment an electrical connector comprises a retaining unit. The retaining unit comprises a first retaining member and a second retaining member. A slot is defined by the first retaining member and the second retaining member, the slot is positioned between the first retaining member and the second retaining member. The electrical connector further comprises a first contact unit. The first contact unit is retained to the first retaining member and comprises a plurality of first terminals. Each of the first terminals comprises a first mating portion extending to the slot, and the first mating portions of the first terminals are arranged as a matrix on a first side of the slot. The electrical connector further comprises a second contact unit. The second contact unit is retained to the second retaining member and comprises a plurality of second terminals. Each of the second terminals comprises a second mating portion extending to the slot, and the second mating portions of the second terminals are arranged as a matrix on a second side of the slot, the second side is opposite to the first side.

[0005] In an embodiment, the first retaining member and the second retaining member each are provided with a limiting plate on the corresponding side of the slot, the limiting plate has a plurality of through holes, the through holes are arranged as a matrix, the first mating portions pass through the through holes of the first retaining member and insert into the slot, the second mating portions pass through the through holes of the second retaining member and insert into the slot.

[0006] In another embodiment, an electrical connector assembly comprises a board, a card edge module and an electrical connector. The card edge module comprises a card edge, both sides of the card edge each are provided with a plurality of conductive pads which are arranged as a matrix. The card edge module is perpendicular to the board. The electrical connector comprises an insulating case having a mounting face, a first mating face, a second mating face and a slot surface, the slot surface has a slot, and the slot surface is adjacent to the mounting face. The electrical connector further comprises a plurality of terminals, both ends of each of the terminals respectively have a mounting portion and a mating portion, the mounting portions of the terminals are positioned on the mounting face and electrically connect the electrical connector and the board. The mating portions of the plurality of terminals are arranged as a matrix on the first mating face and the second mating face, when the card edge module mates with the electrical connector, the mating portions of the plurality of terminals electrically connect with the conductive pads on the both sides of the card edge; the electrical connector is mounted on the board via the mounting face. The first mating face faces the second mating

face, the first mating face and the second mating face are perpendicular to the mounting face. The slot is positioned between the first mating face and the second mating face, the slot receives the card edge of the card edge module, the card edge is inserted into the slot on the slot surface in a first direction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Various aspects of the disclosed content of the present disclosure will be best understood by the following detailed description in combination with the accompanying figures. It should be noted that features depicted herein are not drawn to scale. Instead the sizes of the various features can be arbitrarily increased or reduced.

[0008] FIG. 1 is a perspective view of a prior art electrical connector system 1.

[0009] FIG. 2A is an exploded perspective view of an embodiment of electrical connector.

[0010] FIG. 2B is another perspective view of the embodiment depicted in FIG. 2A viewed from the bottom.

[0011] FIG. 3 is an exploded perspective view of a second contact unit in FIG. 2A.

[0012] FIG. 4 is an exploded perspective view of a wafer module of the second contact unit in FIG. 3.

[0013] FIG. 5A is an elevated sectional view of a retaining unit receiving a first contact unit and the second contact unit in FIG. 2A.

[0014] FIG. 5B is a sectional view of the retaining unit receiving the first contact unit and the second contact unit in FIG. 2A.

[0015] FIG. 6A is an exploded perspective view of an electrical connector assembly of an embodiment in the present disclosure.

[0016] FIG. 6B is a perspective view of the electrical connector assembly in FIG. 6A viewed from the bottom.

[0017] FIG. 7 is a perspective view of the electrical connector assembly in FIG. 6A.

[0018] FIG. 8 is an enlarged perspective view of an area Z of the electrical connector assembly in FIG. 7, in which the retaining unit and the boards are not shown, but only a set of terminal assembly is shown.

[0019] FIG. 9 is a cross-sectional view of the electrical connector assembly taken along a line A-A' in FIG. 8, in which the retaining unit is not shown.

[0020] FIG. 10 is a perspective view of the electrical connector assembly of an embodiment in the present disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] The following disclosure provides many different embodiments or examples so as to implement the different characteristics of the present application. Specific examples of components and configurations are described below to simplify the disclosure of the present application. It is certainly that the present disclosure is to be considered as an exemplification, and is not intended to limit the present application. For example, a first feature formed on or above a second feature in following description may comprise the embodiment of forming the first feature and the second feature with direct contact, and also can comprise the other embodiments of forming between the first feature and the second feature, so the first feature and the second feature are not in direct contact. Also, the present application may use same reference numerals in different examples for the purpose of simplicity and clarity instead of controlling the relationship between the different embodiments and/or the structure discussed.

[0022] Also, the present application may use corresponding spatial words, a brief description of similar words such as under, below, lower, above, higher, used for explaining the relationship between a component or feature and another component or feature as shown in figures. The corresponding spatial words can explain different orientations of devices in use or in operation apart from the orientations described in figures. Devices may be positioned (rotating 90 degrees or other orientation), and the corresponding spatial description of the present application can be explained correspondingly. With the understanding that when a feature is formed above another feature or a board, other features can be located there between.

[0023] Referring to FIG. 2A, the electrical connector 2 having an insulating case comprises a first contact unit 20A and a second contact unit 20B, and a retaining unit 22 comprising a first retaining member 22A and a second retaining member 22B. The retaining unit 22 has an outer housing, the outer housing is a portion of the insulating case. An open of a slot surface 221 of the outer housing of the retaining unit 22 exposes a slot 222 which is defined by the first retaining member 22A and the second retaining member 22B and will be shown in detail in FIG. 5A.

[0024] The first contact unit 20A is retained to the first retaining member 22A. Moreover, the first contact unit 20A comprises a plurality of first terminals, two ends of these first terminals each comprise a mounting portion 25 and a first mating portion 27A. The mounting portions 25 are provided on a first mounting face 206A of the first contact unit 20A, and electrically connect the electrical connector 2 and a board, which will be shown in detail in FIG. 6A. The first mating portions 27A are provided on a first mating face 204A of the first contact unit 20A, and are arranged as a matrix on the first mating face 204A. In an embodiment, the first mating face 204A is perpendicular to the first mounting face 206A. The first mating portions 27A pass through the first retaining member 22A, are positioned in through holes 226 of a limiting plate 224 on a first side of the slot 222 and inserted into the slot 222. The first mating portions 27A electrically connect with conductive pads on a first side of a card edge of a card edge module, which will be shown in detail in FIG. 8.

[0025] The second contact unit 20B is retained to the second retaining member 22B. Moreover, the second contact unit 20B comprises a plurality of second terminals. Two ends of these second terminals each comprise a mounting portion 25 and a second mating portion 27B. The second terminal has the same structure as the first terminal, that is the second mating portion 27B has the same structure as the first mating portion 27A, different numerals are only used to distinguish the mating portions of the first contact unit 20A and the mating portions of the second contact unit 20B. The mounting portions 25 are provided on a second mounting face 206B of the second contact unit 20B, and are used to electrically connect the connector 2 and a board, which will be shown in detail in FIG. 6A. The second mating portions 27B are provided on a second mating face 204B of the second contact unit 20B, and are arranged as a matrix on the second mating face 204B. In an embodiment, the second mating face 204B is perpendicular to the second mounting face 206B. The second mating portions 27B pass through the second retaining member 22B, are positioned in through holes 226 of a limiting plate 224 on a second side of the slot 222 and inserted into the slot 222. In an embodiment, the second side is opposite to the first side. The second mating portions 27B electrically connect with conductive pads on a second side of the card edge of the card edge module, which will be shown in detail in FIG. 8.

[0026] Referring to FIG. 2B, it can be clearly seen that the second mating portions 27B of the second contact unit 20B are arranged as a matrix. Although an arrangement of the first mating portions 27A of the first contact unit 20A is not definitely shown in FIG. 2B, the arrangement of the first mating portions 27A of the first contact unit 20A is essentially the same

as the arrangement of the second mating portions 27B of the second contact unit 20B, therefore, it can be understood that the first mating portions 27A of the first contact unit 20A are also arranged as a matrix.

[0027] Referring to FIG. 3, the second contact unit 20B comprises a plurality of wafer modules 30. Each of the wafer modules 30 has a wafer housing (referring to FIG. 4). These wafer modules 30 and the wafer housings are arranged as a row in a first direction D1, the first direction D1 is a direction in which a card edge is inserted into the slot 222, which will be shown in detail in FIG. 8. Moreover, the second mating portions 27B of each wafer module 30 are arranged as a column in a second direction D2. In an embodiment, the first direction D1 is perpendicular to the second direction D2. In an embodiment, the second contact unit 20B comprises at least two wafer modules 30 so that the second contact unit 20B has the second mating portions 27B arranged in a matrix arrangement.

[0028] The second mating face 204B of the second contact unit 20B is formed by side surfaces of the wafer housings of the wafer modules 30 of the second contact unit 20B which face the slot 222. The second mounting face 206B of the second contact unit 20B is formed by side surfaces of the wafer housings of the wafer modules 30 of the second contact unit 20B which face a board.

[0029] The structure of the second contact unit 20B and components thereof are to the same as those of the first contact unit 20A. The first contact unit 20A also has wafer modules 30. In an embodiment, the first contact unit 20A comprises at least two wafer modules 30 so that the first contact unit 20A has the first mating portions 27A arranged in a matrix arrangement.

[0030] The first mating face 204A of the first contact unit 20A is formed by side surfaces of the wafer housings of the wafer modules 30 of the first contact unit 20A which face the slot 222. The first mounting face 206A of the first contact unit 20A is formed by side surfaces of the wafer housings of the wafer modules 30 of the first contact unit 20A which face the board.

[0031] Referring to FIG. 4, the wafer module 30 comprises a terminal assembly 32 having a plurality of terminals 40 and a wafer housing 34 (it can be considered as an insulating body). Two ends of the terminal 40 respectively have a mounting portion 25 and a mating portion 27. When the terminal 40 is provided to the first contact unit 20A, the terminal 40 is considered as the first terminal. In this case, the mating portion 27 of the first contact unit 20A is referred to as the first mating portion 27A. When the terminal 40 is provided to the second contact unit 20B, the terminal 40 is referred to as the second terminal. In this case, the mating portion 27 of

the second contact unit 20B is referred to as the second mating portion 27B.

[0032] The terminals 40 (comprising the first terminals and the second terminals) comprise a plurality of signal terminal pairs 29A, 29B and a ground terminal 29. The ground terminal 29 is provided between any two adjacent signal terminal pairs 29A, 29B. Or, each of two sides of the signal terminal pair 29A, 29B is provided with the ground terminal 29.

[0033] The wafer housing 34 is retained to the outer housing of the retaining unit 22, and is used to seal the terminal assembly 32 to help avoid contact between the terminals. A plurality of wafer housings 34 can be considered as an insulating unit. Accordingly, the plurality of wafer housings 34 of the second contact unit 20B is considered as a second insulating unit. The second insulating unit retains the second terminals of the second contact unit 20B, and has the second mating face 204B. Similarly, the plurality of wafer housings 34 of the first contact unit 20A is considered as a first insulating unit. The first insulating unit retains the first terminals of the first contact unit 20A, and has the first mating face 204A.

[0034] Referring to FIG. 3 again, the wafer housing 34 sealing the terminal assembly 32 is shown in FIG. 3. Accordingly, the second mating portion 27B of the second terminal extends out of the wafer housing 34. Similarly, the first mating portion 27A of the first terminal extends out of the wafer housing 34.

[0035] Referring to FIG. 5A, the slot 222 is defined by the first retaining member 22A and the second retaining member 22B of the retaining unit 22. The first mating face 204A of the first contact unit 20A and the second mating face 204B of the second contact unit 20B face each other and are spaced apart from each other by the slot 222. The first contact unit 20A has a rib 542 interfering with the first retaining member 22A and the second contact unit 20B has a rib 542 interfering with the second retaining member 22B, therefore the first contact unit 20A and the second contact unit 20B are respectively retained by the first retaining member 22A and the second retaining member 22B.

[0036] Referring to FIG. 5B, the retaining unit 22 has received the first contact unit 20A and the second contact unit 20B. Each of the first mating portions 27A of the first contact unit 20A protrudes from the first mating face 204A and protrudes into the slot 222. Each of the second mating portions 27B of the second contact unit 20B protrudes from the second mating face 204B and protrudes into the slot 222.

[0037] Referring to FIG. 6A, the electrical connector assembly 6 comprises the electrical connector 2 illustrated in FIG. 2A, a card edge module 62 and a board 64. The card edge module

62 is perpendicular to the board 64. The card edge module 62 has a card edge 622, the card edge 622 is inserted into the slot 222 of the electrical connector 2. A first side S1 of the card edge 622 has a plurality of conductive pads 624, the conductive pads 624 are arranged as a matrix and electrically connect with the first mating portions 27A of the first contact unit 20A respectively, which will be shown in detail in FIG. 8. The board 64 has a plurality of conductive pads 642. The conductive pads 642 are electrically connected to the first mounting portions 25 of the first contact unit 20A of the electrical connector 2 respectively.

[0038] In the present disclosure, the slot surface 221 having the opening exposing the slot 222 and used for receiving the card edge 622 is adjacent to the first mounting face 206A and the second mounting face 206B of the electrical connector 2. More specifically, the slot surface 221 is not opposite to the first mounting face 206A and is not opposite to the second mounting face 206B. Due to this structure, the cooling effect can be improved, which will be shown in detail in FIG. 10.

[0039] Referring to FIG. 6B, a second side S2 of the card edge 622 has a plurality of conductive pads 624. The second side S2 is opposite to the first side S1. The conductive pads 624 are arranged as a matrix, and electrically connect with the second mating portions 27 of the second contact unit 20B respectively. Moreover, as described above, the second mounting face 206B is formed by the side surfaces of the wafer housings 34 of the second contact unit 20B which face the board 64, the first mounting face 206A is formed by the side surfaces of the wafer housings 34 of the first contact unit 20A which face the board 64.

[0040] Referring to FIG. 7, the card edge 622 of the edge module 62 has been inserted into the slot 222 of the electrical connector 2. Moreover, the electrical connector 2 has been provided on the board 64.

[0041] The card edge 622 of the card edge module 62 is inserted into the slot 222 in the first direction D1. From the arrangement of the conductive pads 624 of the card edge 622, it can be understood that the first mating portions 27A of the first contact unit 204A are arranged on a side of the slot 222 in a matrix. Of course, the second mating portions 27B of the second contact unit 204B are arranged on another side of the slot 222 in a matrix. Briefly speaking, when the card edge module 62 mates with the electrical connector 2, the first mating portions 27A of the first contact unit 20A and the second mating portions 27B of the second contact unit 20B electrically connect with the conductive pads 624 on the both sides of the card edge 622 correspondingly.

[0042] The first mating portions 27A of the first contact unit 20A contacting the conductive pads 624 have elasticity, and extend in the first direction D1 (that is the direction in which the card edge 622 is inserted into the slot 22). Similarly, the second mating portions 27B of the second contact unit 20B contacting the conductive pads 624 have elasticity, and extend in the first direction D1 (that is the direction in which the card edge 622 is inserted into the slot 22).

[0043] Referring to FIG. 9, contact between the card edge module 62 and the first contact unit 20A and the second contact unit 20B can be clearly seen from FIG. 9.

[0044] Referring to FIG. 10, the electrical connector assembly 11 comprises a plurality of electrical connector assemblies 6 in FIG. 7. The electrical connector assemblies 6 are arranged as a matrix, for simplicity of illustration, only the 2x2 electrical connector assemblies 11 have been shown, but the present disclosure is not limited to this. Moreover, in the embodiment, each of the card edge modules 62 is independent, but the present disclosure is not limited to this. For example, the card edge modules 62 of the electrical connector assembly 6 arranged as a column can be integrated into the same one card edge module.

[0045] In the present disclosure, the first mounting face 206A and the second mounting face 206B which are mounted on the board 64 are adjacent to the slot surface 221 of the slot 222, and the first mounting face 206A and the second mounting face 206B are not opposite to the slot surface 221, therefore airflow (or wind) can flow from one side of a flat surface 100 to the other side of the flat surface 100, so that the cooling effect can be improved. In other words, supposing that a connecting face 644 of the board 64 is opposite to the slot surface 221 (in this case, a plane where the board 64 is present is parallel to the flat surface 100), the board 64 will block wind, so that wind cannot flow from one side of the flat surface 100 to the other side of the flat surface 100, this cooling effect is poor.

[0046] As can be appreciated, the first contact unit 20A and the second contact unit 20B which electrically connect with (or contact) the card edge module 62 face each other, therefore only one connector 2 is required to transmit the signal from the card edge module 62 to the board 64. For example, the first contact unit 20A is provided with 50 first mating portions 27A of the first terminals and the second contact unit 20B is provided with 50 second mating portions 27B of the second terminals, therefore the signal is transmitted from the card edge module 62 to the board 64 via 100 mating portions. Briefly speaking, in the case that the number of the mating portions of the terminals electrically connecting with (or contacting) the card edge module 62 is constant, due to the structure of the electrical connector 2 in the present

disclosure, the electrical connector assembly 6 needs only one electrical connector 2. Because only one electrical connector 2 is required, the transmission path is short and the number of terminal contact points is reduced, signal transmission rate is increased. Moreover, because the number of terminal contact points and impedance are reduced, power consumption is reduced, therefore, it can reduce the dependence on the additional cooling system. And also because only one electrical connector 2 is used, the costs can be reduced.

[0047] In the disclosure of the present specification, characteristics related to specific embodiments were described, as a result, a person of ordinary skill in the art may be more aware of the various aspects of the disclosure of the present application. The person of ordinary skill in the art should understand that the disclosure of the present application can be used easily to design or modify other processes and structures and to achieve the same purpose and/ or to achieve the same advantages as detailed description of the present application. The person of ordinary skill in the art should also understand that the structures and could naturally devise other embodiments, modifications, and variations with reference to the disclosure of the present specification without departing from the spirit and scope of the disclosure of the present application.

CLAIMS

What is claimed is:

1. An electrical connector, comprising:
 - a retaining unit comprising a first retaining member and a second retaining member, a slot being defined by the first retaining member and the second retaining member, the slot being positioned between the first retaining member and the second retaining member;
 - a first contact unit retained to the first retaining member and comprising a plurality of first terminals, each of the first terminals comprising a first mating portion extending to the slot, and the first mating portions of the first terminals being arranged as a matrix on a first side of the slot; and
 - a second contact unit retained to the second retaining member and comprising a plurality of second terminals, each of the second terminals comprising a second mating portion extending to the slot, and the second mating portions of the second terminals being arranged as a matrix on a second side of the slot, the second side being opposite to the first side.
2. The electrical connector according to Claim 1, wherein the first retaining member and the second retaining member each are provided with a limiting plate on the corresponding side of the slot, the limiting plate has a plurality of through holes, the through holes are arranged as a matrix, the first mating portions pass through the through holes of the first retaining member and insert into the slot, the second mating portions pass through the through holes of the second retaining member and insert into the slot.
3. The electrical connector according to Claim 1, wherein
 - the first contact unit further comprises a first insulating unit retaining the first terminals and having a first mating face;
 - the second contact unit further comprises a second insulating unit retaining the second terminals and having a second mating face; and
 - the first mating face and the second mating face face each other and are spaced apart from each other by the slot, the first mating portions protrude from the first mating face, and the second mating portions protrude from the second mating face.

4. The electrical connector according to Claim 3, wherein the first insulating unit comprises a plurality of insulating bodies, the insulating bodies are arranged as a row in a first direction, each of the insulating bodies is provided with the first terminals, the first mating portions of the first terminals are arranged as a column in a second direction; and

the second insulating unit comprises a plurality of insulating bodies, the insulating bodies are arranged as a row in the first direction, each of the insulating bodies is provided with the second terminals, the second mating portions of the second terminals are arranged as a column in the second direction.

5. The electrical connector according to Claim 4, wherein the first terminals of the first insulating unit comprise a plurality of signal terminal pairs, a ground terminal is provided between any two adjacent signal terminal pairs of the plurality of signal terminal pairs; and

the second terminals of the second insulating unit comprise a plurality of signal terminal pairs, a ground terminal is provided between any two adjacent signal terminal pairs of the plurality of signal terminal pairs.

6. The electrical connector according to Claim 4, wherein the first terminals of the first insulating unit comprise a plurality of signal terminal pairs, both sides of any pair of the plurality of signal terminal pairs each are provided with a ground terminal; and

the second terminals of the second insulating unit comprise a plurality of signal terminal pairs, both sides of any pair of the plurality of signal terminal pairs each are provided with a ground terminal.

7. The electrical connector according to Claim 1, wherein the first contact unit comprises a plurality of wafer modules, the wafer modules are arranged as a row in a first direction, each of the wafer modules comprises an insulating body and the first terminals, the first terminals are provided to the insulating body, the first mating portions of the first terminals protrude from the insulating body and insert into the slot, and are arranged as a column in a second direction;

the second contact unit comprises a plurality of wafer modules, the wafer modules are arranged as a row in the first direction, each of the wafer modules comprises an insulating

body and the second terminals, the second terminals are provided to the insulating body, the second mating portions of the second terminals protrude from the insulating body and insert into the slot, and are arranged as a column in the second direction.

8. The electrical connector according to Claim 7, wherein
the first terminals comprise a plurality of signal terminal pairs, a ground terminal is provided between any two adjacent signal terminal pairs of the plurality of signal terminal pairs;
the second terminals comprise a plurality of signal terminal pairs, a ground terminal is provided between any two adjacent signal terminal pairs of the plurality of signal terminal pairs.

9. The electrical connector according to Claim 7, wherein
the first terminals comprise a plurality of signal terminal pairs, both sides of any pair of the plurality of signal terminal pairs each are provided with a ground terminal;
the second terminals comprise a plurality of signal terminal pairs, both sides of any pair of the plurality of signal terminal pairs each are provided with a ground terminal.

10. The electrical connector according to any one of Claims 1-9, wherein the slot receives a card edge of a card edge module, both sides of the card edge each are provided with a plurality of conductive pads which are arranged as a matrix, the conductive pads on the both sides of the card edge respectively electrically connect with the first mating portions of the first terminals and the second mating portions of the second terminals.

11. An electrical connector assembly, comprising:
a board;
a card edge module comprising a card edge, both sides of the card edge each being provided with a plurality of conductive pads which are arranged as a matrix, the card edge module being perpendicular to the board; and
an electrical connector comprising:
an insulating case having a mounting face, a first mating face, a second mating face and a slot surface, the slot surface having a slot, and the slot surface being adjacent to the mounting face; and

a plurality of terminals, both ends of each of the terminals respectively having a mounting portion and a mating portion, the mounting portions of the terminals being positioned on the mounting face and electrically connecting the electrical connector and the board; the mating portions of the plurality of terminals being arranged as a matrix on the first mating face and the second mating face, when the card edge module mating with the electrical connector, the mating portions of the plurality of terminals electrically connecting with the conductive pads on the both sides of the card edge; the electrical connector being mounted on the board via the mounting face;

the first mating face facing the second mating face, the first mating face and the second mating face being perpendicular to the mounting face; and

the slot being positioned between the first mating face and the second mating face, the slot receiving the card edge of the card edge module, the card edge being inserted into the slot on the slot surface in a first direction.

12. The electrical connector assembly according to Claim 11, wherein the mating portions extend in a direction in which the card edge is inserted into the slot, and the mating portions have elasticity.

13. The electrical connector assembly according to Claim 11, wherein the insulating case comprises:

an outer housing having the slot; and

a plurality of wafer housings respectively provided on both sides of the slot so as to arrange as a row in the first direction on each side of the slot and retained to the outer housing, each of the wafer housings is provided with the terminals, the mating portions of the terminals are arranged as a column in a second direction, the first mating face is formed by side surfaces of the wafer housings which face the slot, and the mounting face is formed by side surfaces of the wafer housings which face the board.

14. The electrical connector assembly according to Claim 13, wherein the terminals comprise a plurality of signal terminal pairs, a ground terminal is provided between any two adjacent signal terminal pairs of the plurality of signal terminal pairs.

15. The electrical connector assembly according to Claim 13, wherein the terminals comprise a plurality of signal terminal pairs, both sides of any pair of the plurality of signal terminal pairs each are provided with a ground terminal.

16. The electrical connector assembly according to any one of Claims 13-15, wherein the outer housing is integrally provided with a limiting plate on each of the both sides of the slot, the limiting plate has a plurality of through holes arranged as a matrix, the mating portions of the terminals pass through the through holes and insert into the slot.

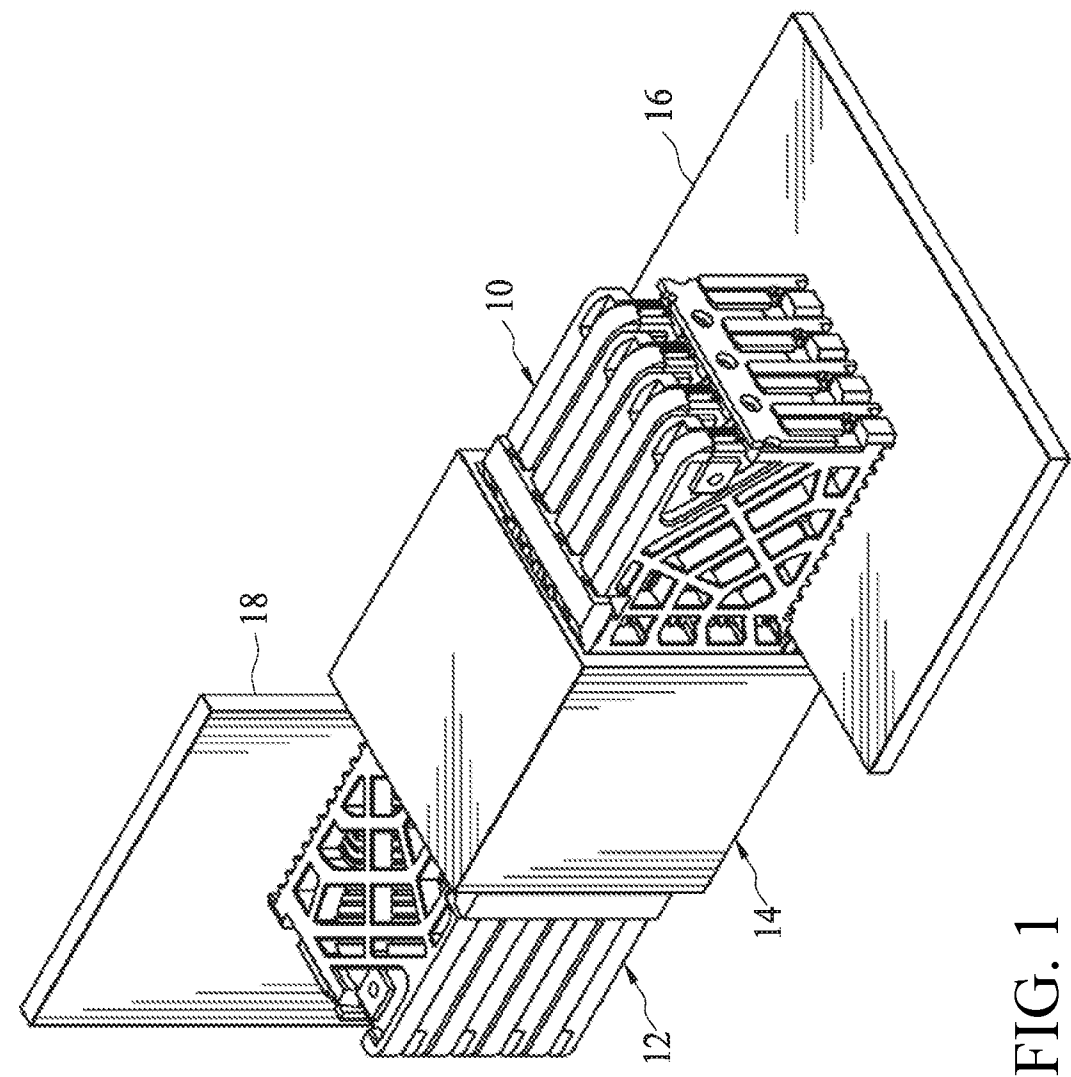
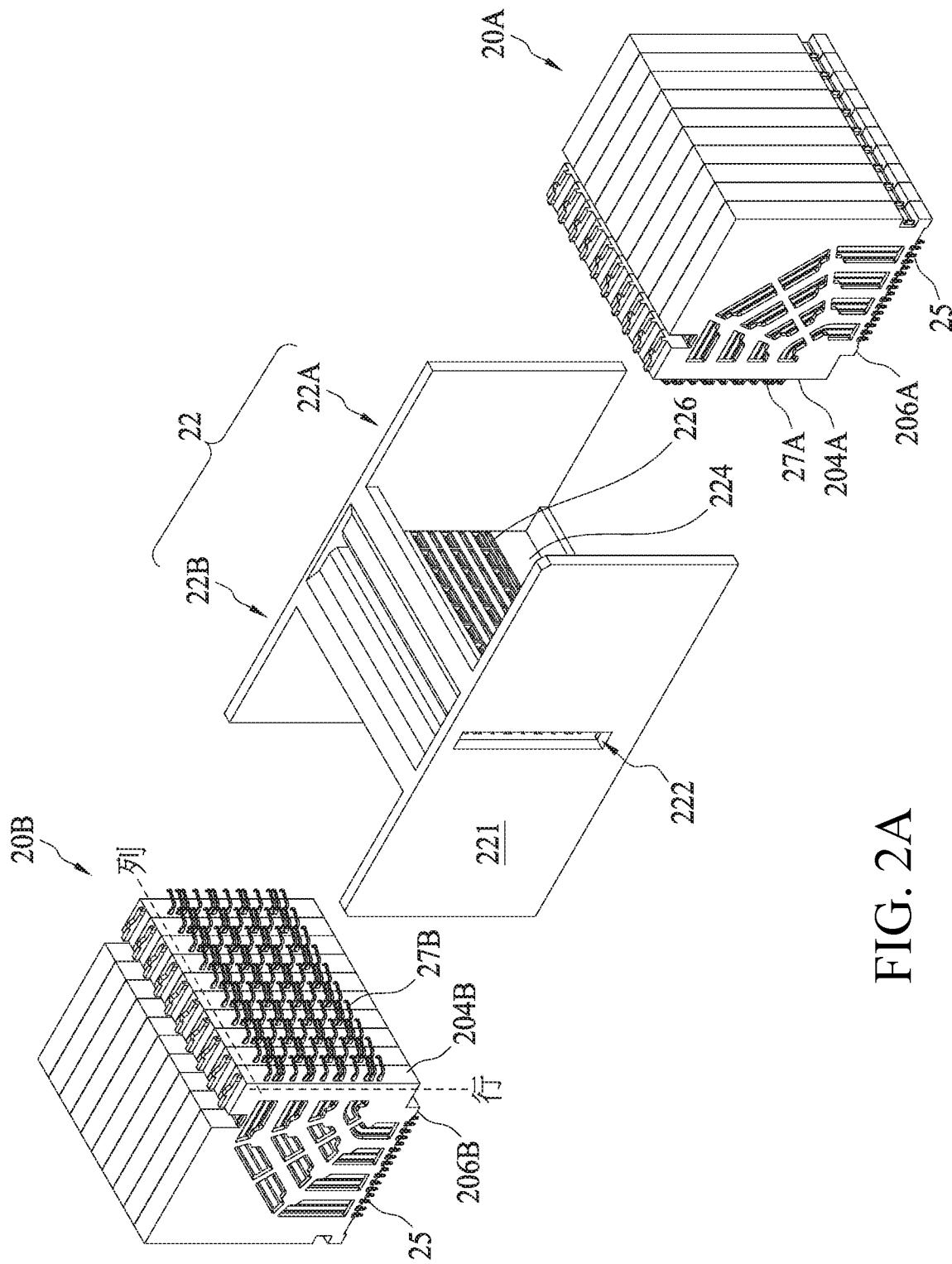


FIG. 1



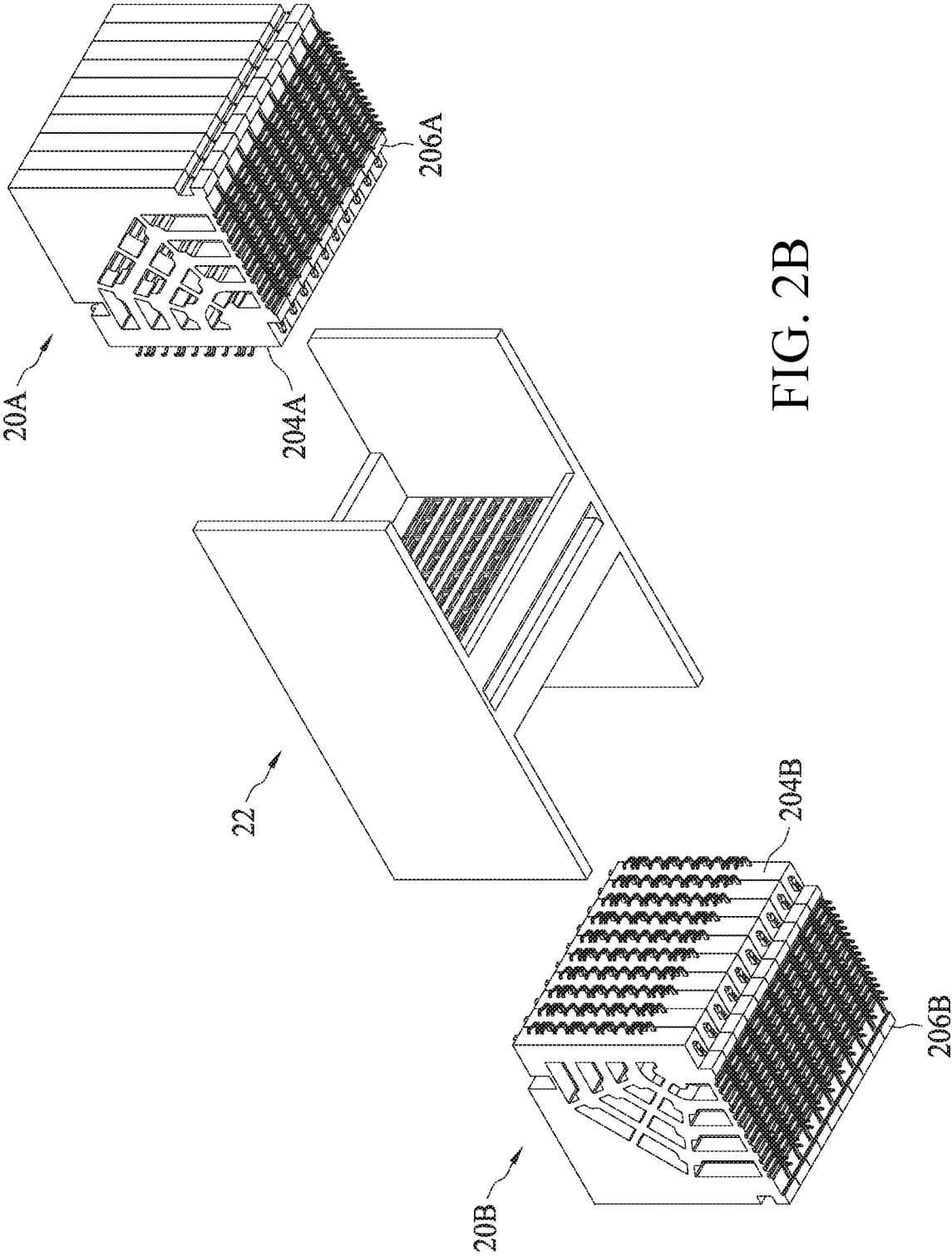
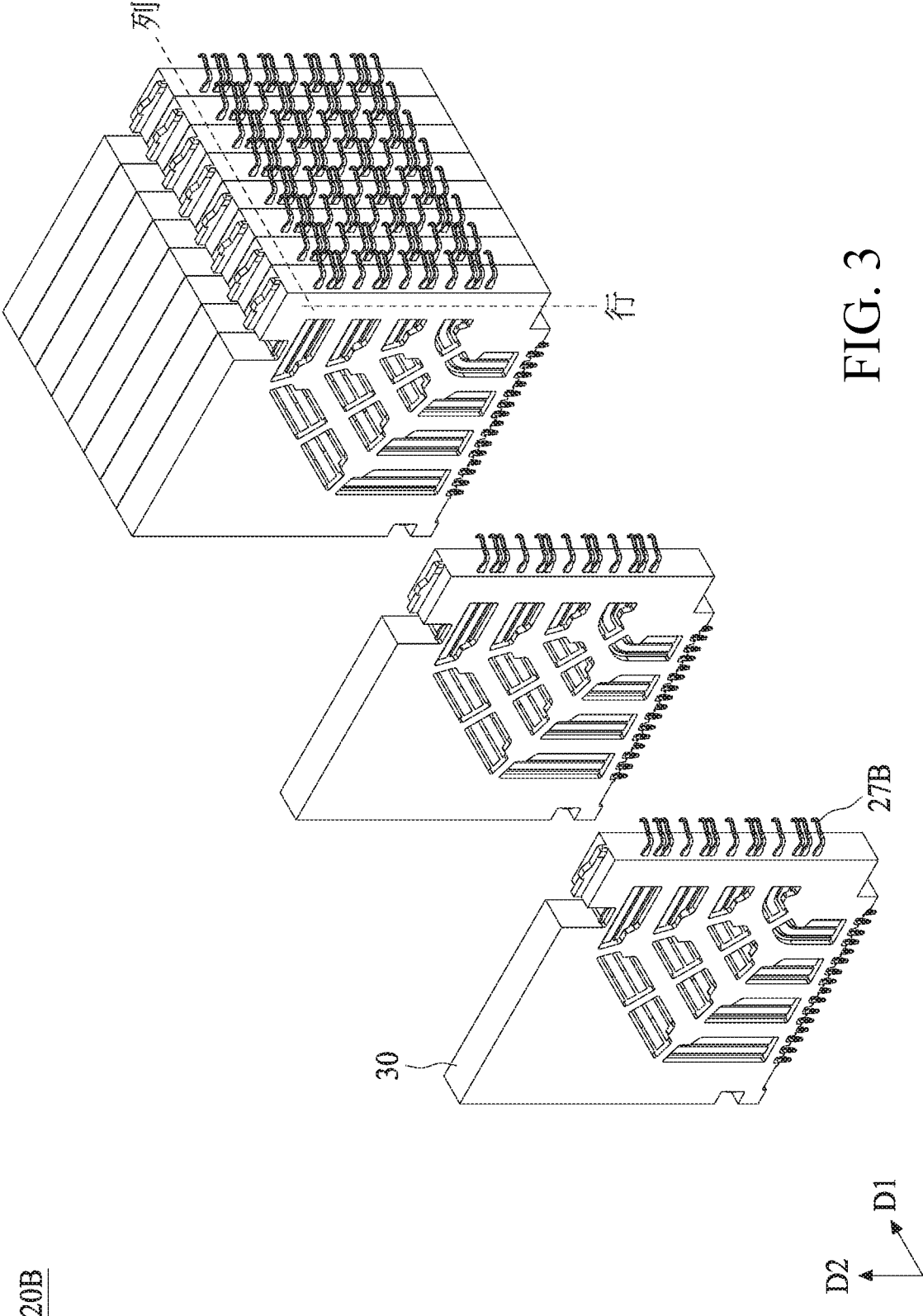
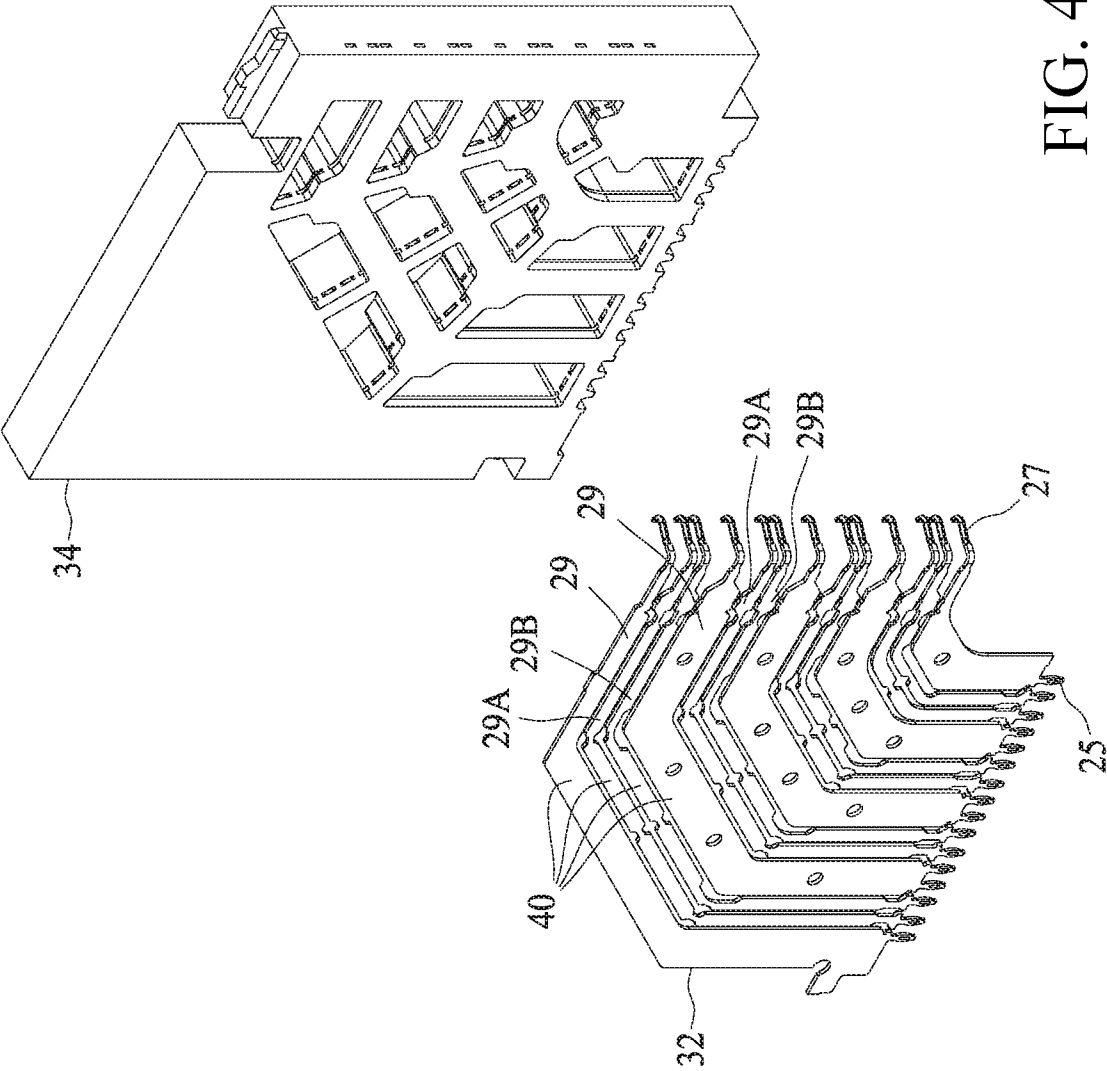


FIG. 2B



20B



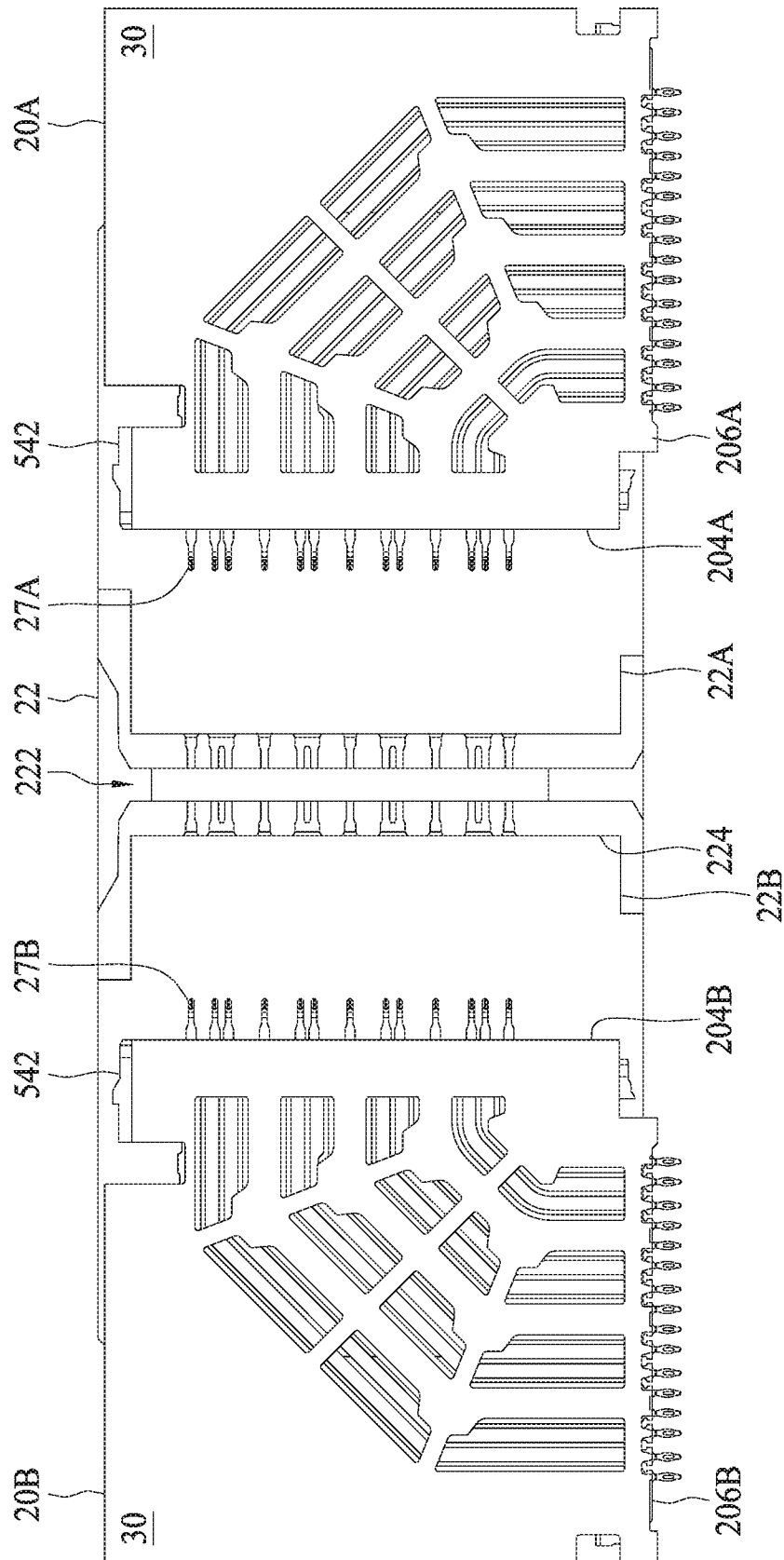


FIG. 5A

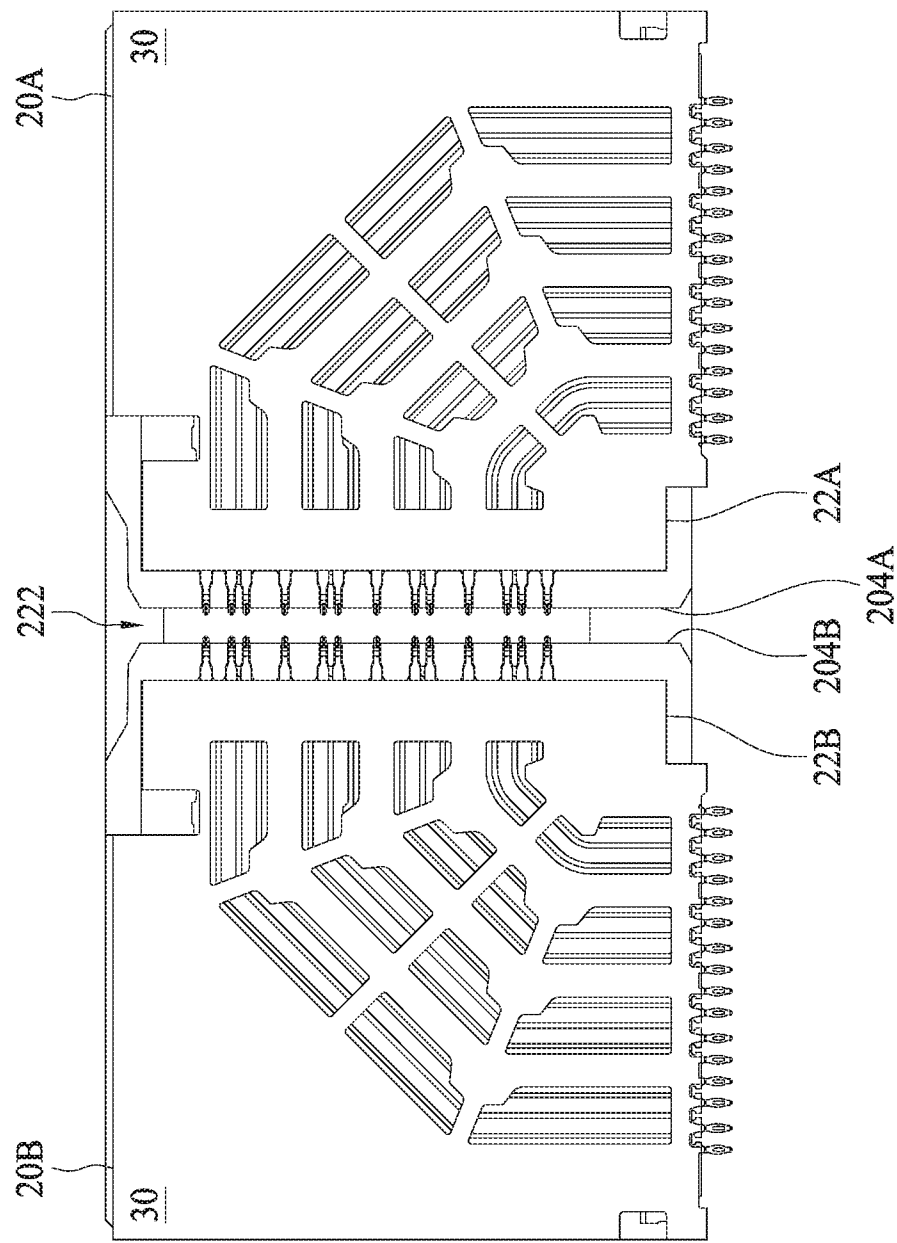


FIG. 5B

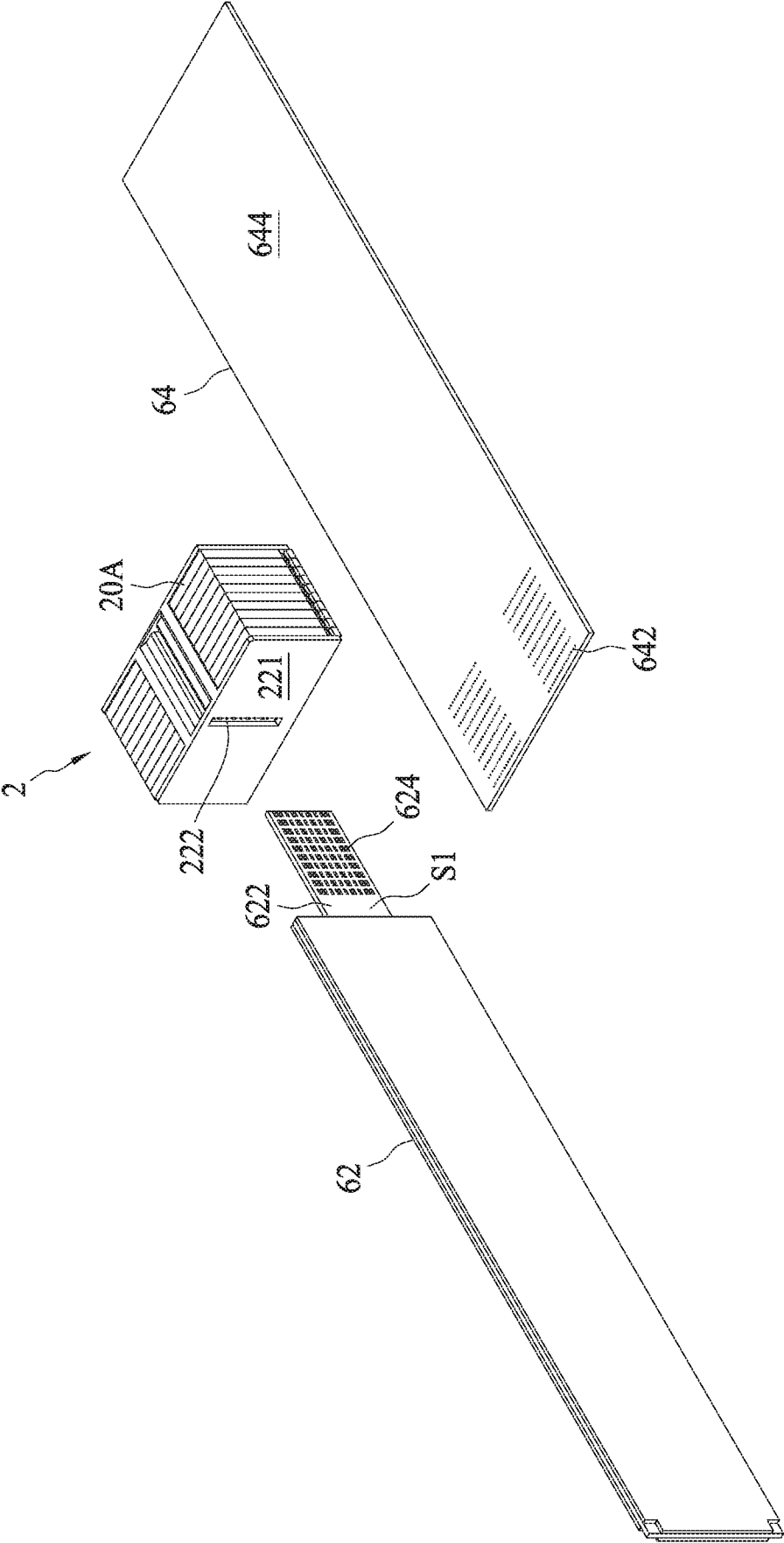


FIG. 6A

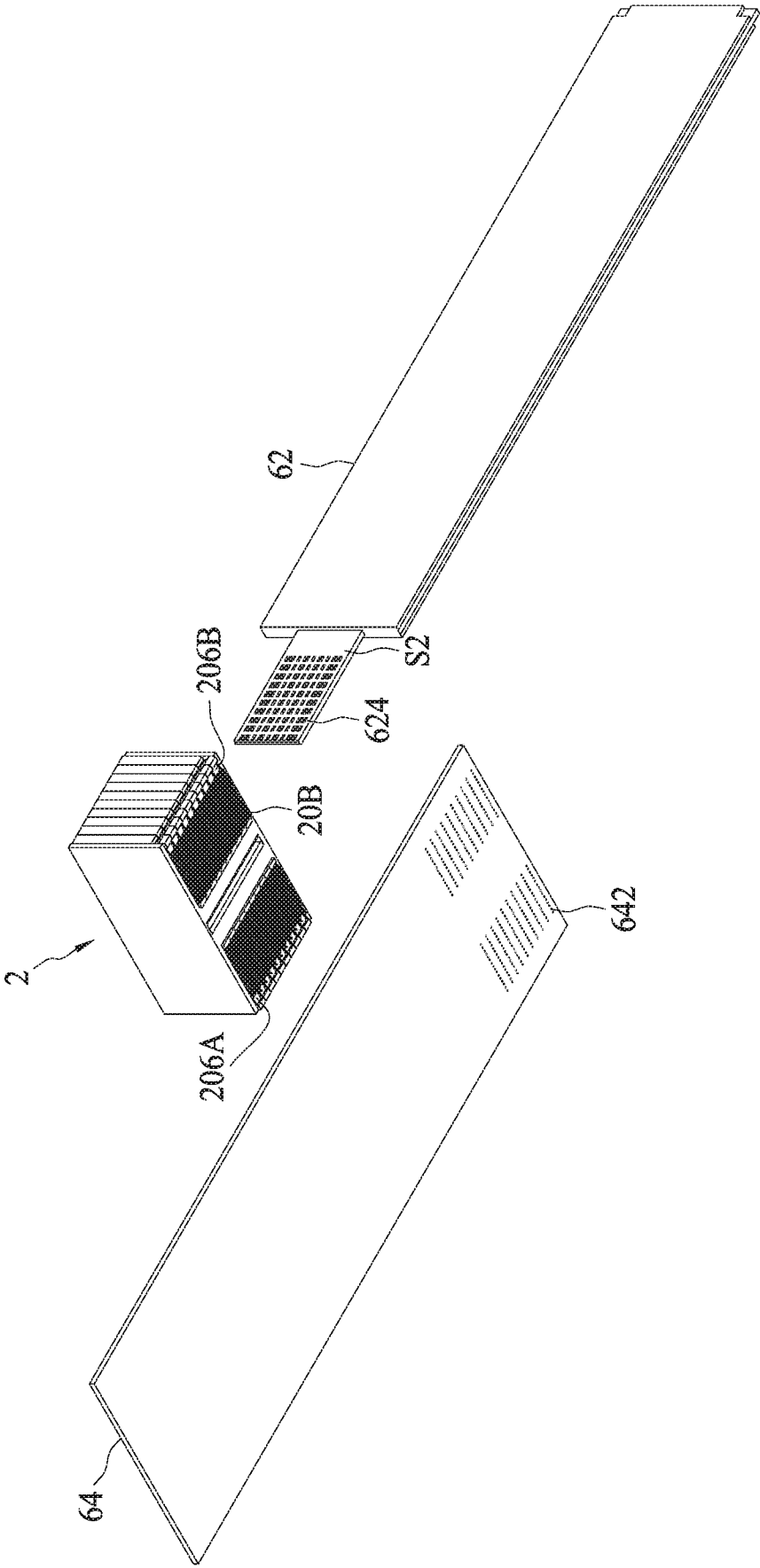


FIG. 6B

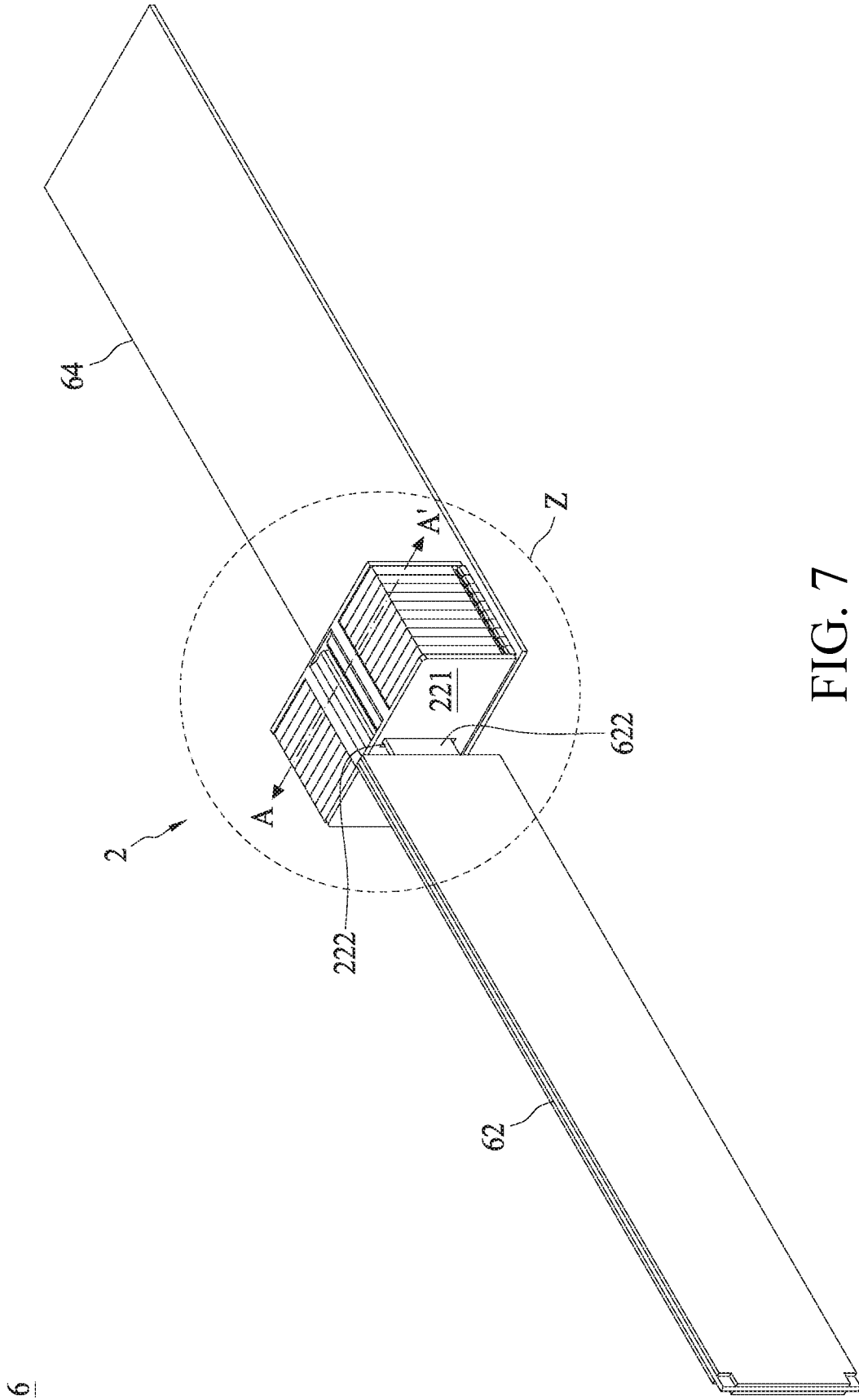
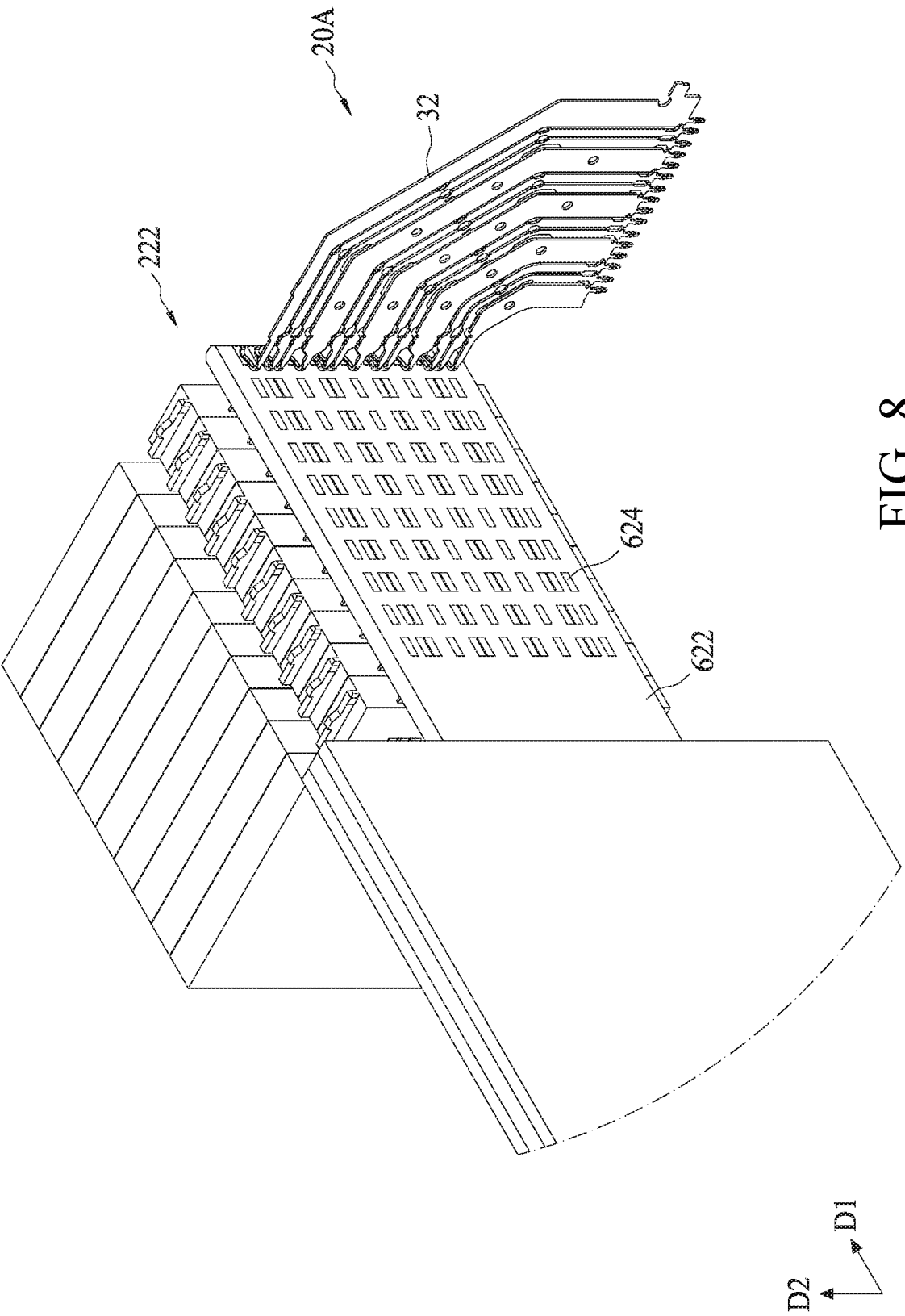


FIG. 7



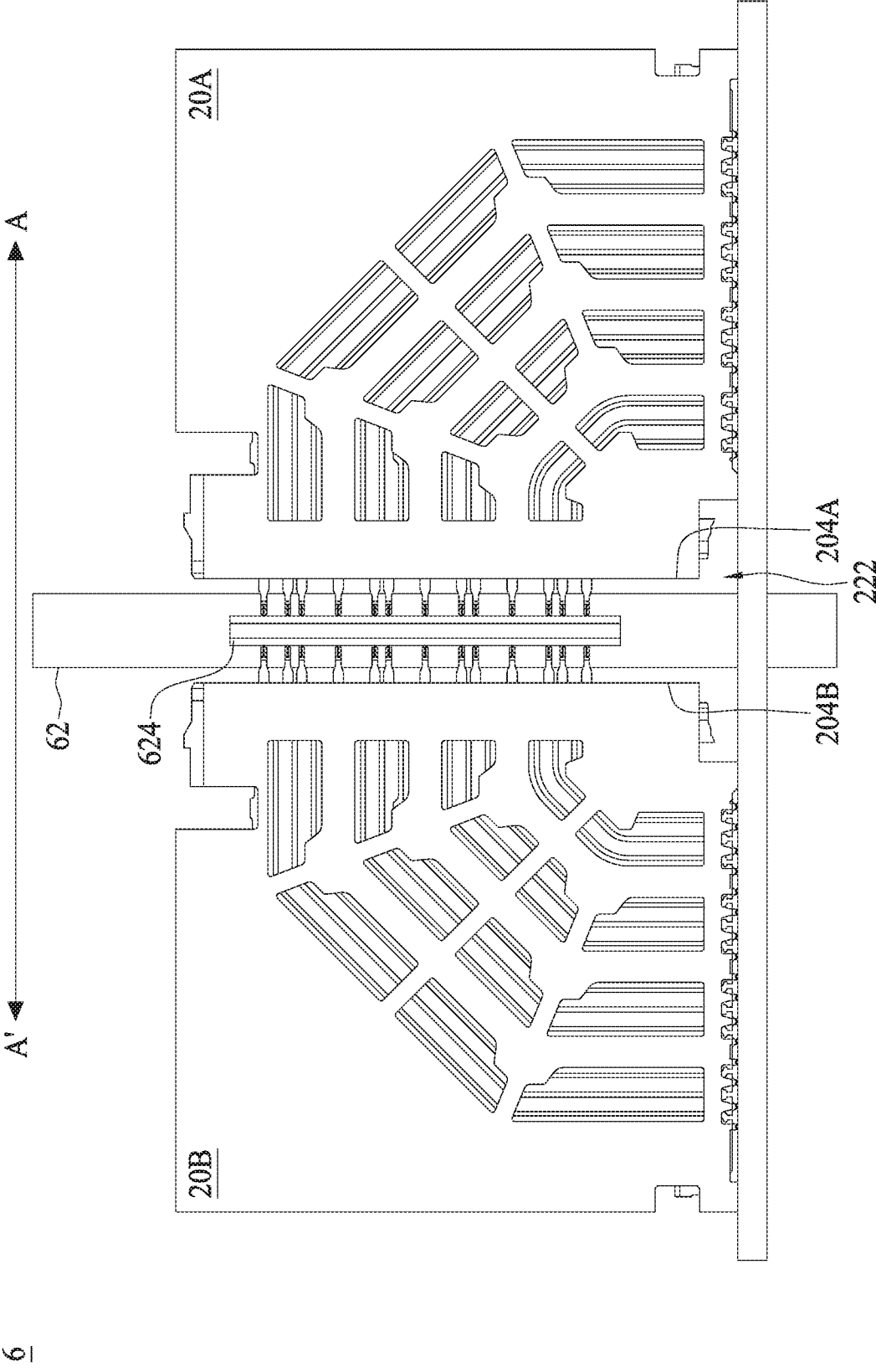


FIG. 9

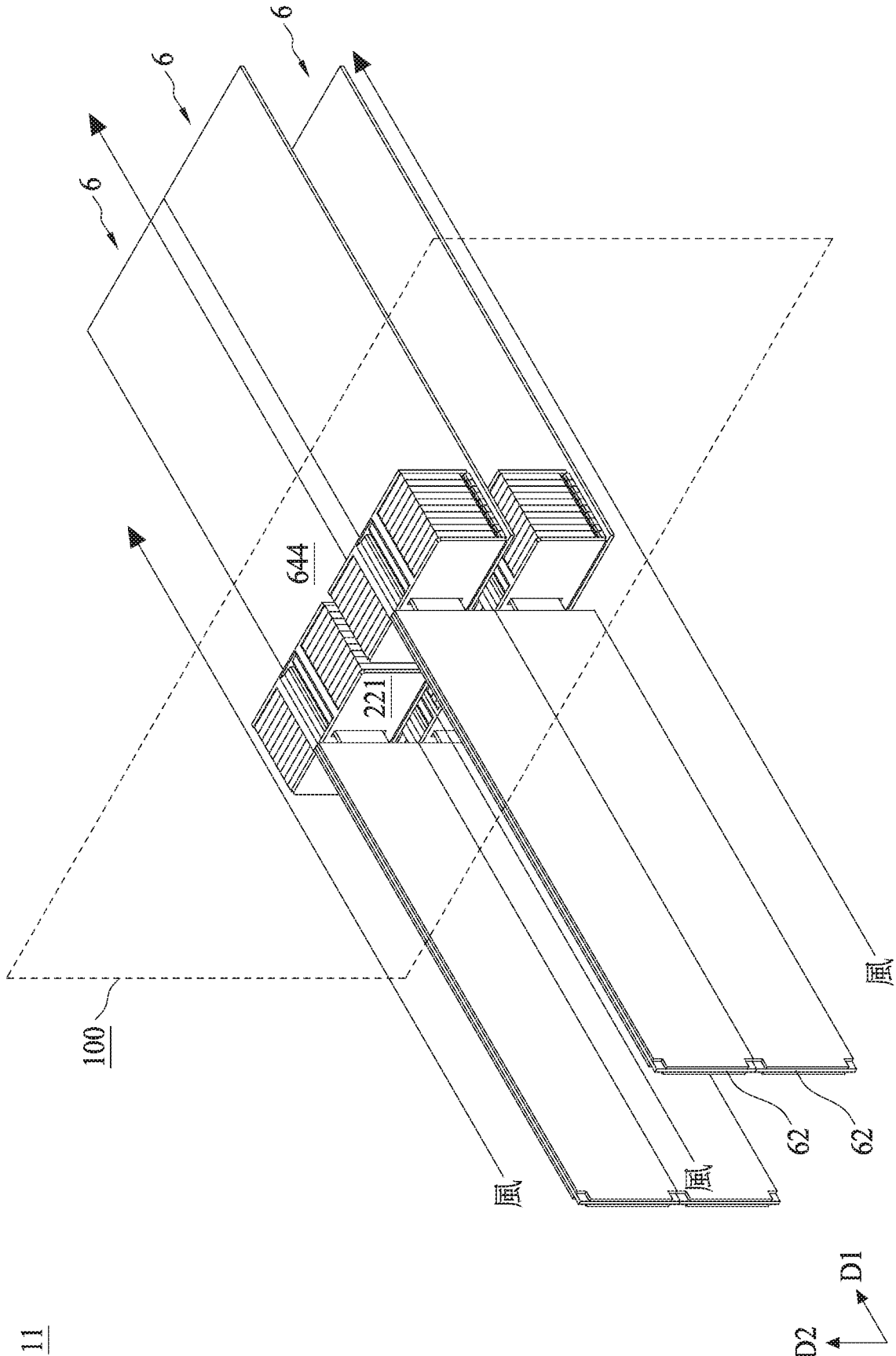


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/029777**A. CLASSIFICATION OF SUBJECT MATTER****H01R 12/77(2011.01)i, H01R 12/70(2011.01)i, H01R 107/00(2006.01)n**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H01R 12/77; H01R 13/648; H01R 31/06; H01R 9/24; H05K 1/14; H05K 1/02; H01R 12/00; H01R 12/70; H01R 107/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: retaining unit, slot, card edge module, wafer, terminal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2014-0099829 A1 (MOLEX INCORPORATED) 10 April 2014 See paragraphs [0045]-[0058], claims 1-5 and figures 1-4, 20A.	1-16
Y	US 2010-0210123 A1 (JORDAN MARSHALL COLE et al.) 19 August 2010 See paragraphs [0011]-[0020], claims 1-3 and figures 1-3.	1-16
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Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

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Date of mailing of the international search report

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Name and mailing address of the ISA/KR

International Application Division

Korean Intellectual Property Office

189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea

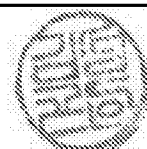


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INTERNATIONAL SEARCH REPORT

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International application No.

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