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(54) **CONNECTOR FOR PRINTED-CIRCUIT BOARDS**

STECKVERBINDER FÜR LEITERPLATTEN

CONNECTEUR POUR CARTES DE CIRCUITS IMPRIMÉS

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Description

Field of the invention

[0001] The present invention relates to an electrical circuit comprising a printed-circuit board having a first series of holes, and a connector comprising:

- a casing; and
- a set of metal terminals inserted within said casing and designed to couple with respective holes made in said printed-circuit board.

General technical problem

[0002] As is known, coupling between the metal terminals of a traditional connector and the respective holes of the printed-circuit board on which the connector is to be mounted is conventionally obtained via a soldering operation. Even though this operation is by now carried out in an altogether automated way, it has, however, a considerable effect on the costs and times for production of the final electrical circuit. Document EP0527578A1 discloses a connector for an electric part having a contact shutter device for forming an open state or a closed state of a contact.

Object and summary of the invention

[0003] The object of the present invention is hence to provide a system for connection between the printed-circuit board and the connector that will not require any soldering operation.

[0004] The above object is achieved via an electrical circuit having the characteristics referred to in the claims.

[0005] The claims form an integral part of the technical teaching provided herein in relation to the invention.

Brief description of the drawings

[0006] Further characteristics and advantages of the invention will emerge clearly from the ensuing description with reference to the annexed drawings, which are provided purely by way of non-limiting example and in which:

- Figure 1 is a perspective view of an embodiment of the connector described herein in a condition where it is mounted on a printed-circuit board;
- Figure 2 is an exploded perspective view of the connector of Figure 1;
- Figures 3a, 3b, and 3c represent the connector of Figure 1 in a perspective view sectioned along a transverse plane of section, in three distinct conditions, during assembly of the connector on the printed-circuit board;
- Figures 4a, 4b, and 4c represent the connector in the conditions of Figures 3a, 3b, 3c in perspective views sectioned along a plane of section parallel to the plane of section of Figures 3a, 3b, 3c; and
- Figure 5 is a perspective view of a detail of the connector of Figure 1 fixed on the printed-circuit board.

Detailed description of the invention

[0007] Illustrated in the ensuing description are various specific details aimed at providing an in-depth understanding of the embodiments. The embodiments may be obtained without one or more of the specific details, or with other methods, components, or materials, etc. In other cases, known structures, materials, or operations are not illustrated or described in detail so that various aspects of the embodiment will not be obscured.

[0008] The references used herein are provided merely for convenience and hence do not define the sphere of protection or the scope of the embodiments.

[0009] As mentioned previously, the present invention regards a connector for printed-circuit boards, in particular a signal connector, which can be connected to a printed-circuit board without any need to carry out any soldering operation.

[0010] The connector in question, designated in the figures by the reference number 100, comprises a casing 2 having a closed side wall 2A, preferably characterized by a parallelepipedal geometry, which identifies inside it a seat 2B of corresponding shape, designed to receive the further elements of the connector.

[0011] The casing 2 is designed to be coupled directly on the printed-circuit board, designated in the figures by the reference number 200, and has, for this purpose, one or more pins 21 projecting at the bottom and configured for fitting into corresponding holes 201 made in the printed-circuit board 200 so as to define a correct and precise reference position of the casing on the printed-circuit board.

[0012] The connector 100 further comprises a body 4, which is designed to fit into the seat 2B and carries a set of electrical terminals 14. These have respective portions 14B' that project underneath said body so as to be received in a series of holes 202 provided with electrical contacts (not illustrated), made in the printed-circuit board 200. As will be seen in what follows, electrical connection of the connector to the printed-circuit board is established by coupling of the portions 14B' with the electrical contacts present within the holes 202. In a way in itself known in the art, these contacts may be constituted by metallized portions of the walls of the holes 202. Preferably, the metallization is constituted by a gold plating. The same type of metallization is preferably used also for the portions 14B' of the terminals 14.

[0013] In various embodiments, as in the one illustrated, the body 4 has a shape substantially corresponding to the seat 2B of the casing 2 - in the example illustrated, a generic parallelepipedal shape -, and made thereon are a series of through holes in which the terminals 14 are fixed. In various embodiments, as in the one illustrated (see in this connection Figure 4), the aforesaid termi-

nals each have an electrical-contact portion 14a set within a first hole 41 made in the body 4, and a pin portion 14B, which starts from the portion 14A and traverses a further hole 43, of smaller diameter, made once again in the body 4, and projects, with a part thereof corresponding to the aforesaid portion 14B', underneath the body 4. It should be noted that the portion 14A may be either of a female type, as in the example illustrated, where it is constituted by a bushing, or of a male type. In the condition where the connector is installed on the printed-circuit board, the electrical wires for transmission of the signal to/from the printed-circuit board are then fixed in the portions 14A.

[0014] The connector 100 moreover comprises a clamping element 6 configured for engaging the portions 14B' of the terminals 14 within the casing 2. The element 6 has, in particular, a plate-like portion 6A having a series of through holes 61, preferably flared at the ends, which are each traversed by a corresponding portion 14B' of the terminals 14. At least in an initial stage of assembly of the connector, the holes 61 made in the clamping element must be substantially aligned to the holes 202 made in the printed-circuit board 200 so as to enable the two sets of holes to be traversed by the portions 14B'. The element 6 moreover has one or more hook-shaped elements 63, which project underneath from the portion 6A and are designed to engage corresponding openings 205 made in the printed-circuit board.

[0015] As will emerge clearly from what follows, the element 6 operates within the connector in order to establish both a mechanical fixing and an electrical connection of the connector to the printed-circuit board. Activation of the above element is obtained in a simple and fast way via its interaction with the body 4.

[0016] In particular, the body 4 and the element 6 are configured for interacting with one another, within the casing 2 already mounted on the printed-circuit board, so as to move from a first free condition in which both of them are mobile with respect to the casing, to a condition in which they, and the connector as a whole, are fixed to the printed-circuit board.

[0017] With reference now to Figures 3A-C and 4A-C, in the aforesaid free condition, the body 4 is axially mobile within the seat 2B, i.e., mobile in a direction (designated by Z in the figures) that is substantially parallel to the respective directions of extension of the terminals 14. Guide means - such as the rectilinear grooves 45 and the ribbings 2B' of the example illustrated - may be provided on the mutually coupled sides of the seat 2B and of the body 4 for guiding the body 4 in said movement. The axial movement of the body 4 has the function of determining insertion of the portions 14B' of the terminals in the holes 202 of the printed-circuit board.

[0018] As regards the clamping element 6, it is, instead, mobile in a direction (designated by Y) contained in a plane orthogonal to the direction of movement of the body 4.

[0019] The connector 100 comprises cam means provided on the body 4 and on the element 6, which are configured for inducing a displacement of the element 6 in the direction Y, as a result of the axial movement of the body 4 in the direction Z.

[0020] The displacement of the element 6 induced by the cam means is of an extension such as to bring the holes 61 into a condition slightly out of line with respect to the holes 202 of the printed-circuit board, such that the portions 14B' of the terminals come to be imprisoned between the opposed and immediately adjacent edges of the two sets of holes. In particular, with reference to Figure 4C, as a result of the above displacement by the element 6, each portion 14B' comes to be gripped between the left-hand bottom edge 61' of the corresponding hole 61, and the right-hand top edge 202' of the hole 202. This causes the portions 14B' to be constrained to the printed-circuit board and to the casing 2 and come perfectly into contact with the electrical contacts present in the holes 202. Furthermore, as may be seen in Figure 5, the displacement in question brings the hook-shaped portions 63 of the element 6 into engagement with the corresponding parts of the underside of the printed-circuit board that are rendered accessible through the openings 205, this determining fixing of the casing 2 to the printed-circuit board.

[0021] The cam means in question may be obtained according to different configurations. In various preferred embodiments, as in the one illustrated (see Figure 2), the aforesaid means comprise a wall 6B, which is carried by the plate-like portion 6A of the clamping element and on which one or more cam tracks 64 are provided. In turn, the body 4 has, on its side facing the element 6, a slit 44, which is designed to receive the wall 6B and has, on one or both of its opposite sides, pins 44' that come to engage the cam tracks 64. As may be seen in the figures, each path 64 has, with respect to the direction in which it is traversed by the corresponding pin 44', when the body 4 and the element 6 pass from their free condition to the clamping condition, a first rectilinear stretch 64A, configured for not inducing any displacement of the element 6, and a subsequent curvilinear stretch 64B, configured, instead, for inducing the displacement described above of the clamping element 6. The length of the rectilinear stretch 64A is to be such as to guarantee a given degree of insertion of the portions 14B' of the terminals within the holes 202 before the clamping element comes to grip them against the edges of the latter.

[0022] Figures 3A-C and the corresponding Figures 4A-C illustrate three different subsequent steps of the process for clamping the body 4 and the element 6 on the printed-circuit board 200.

[0023] In particular, Figures 3A and 4A illustrate an initial step, in which the body 4 and the element 6 are in their free condition referred to above. As may be seen in Figure 3A, in this condition, the portions 14B' are still above the printed-circuit board 200, out of the holes 202, and the pins 44' are at the start of the rectilinear stretch 64A of the cam tracks.

[0024] To bring about clamping, from this condition the body 4 is hence pressed and displaced downwards in the direction Z. Figures 3B and 4B represent a second step in which the body 4 has been displaced, with respect to the position of Figures 3A and 4a, by a stretch corresponding to the rectilinear stretch 64A of the cam track, and the pins 44' are in effect located at the end of this stretch and at the start of the curvilinear stretch 64B. In this position of the body 4, the portions 14b' are already inserted in the holes 202.

[0025] Starting from this position, the pins 44' enter the curvilinear stretch 64B, and the interaction between the pins and the path determines displacement of the clamping element 6 in the direction Y, until the clamping condition illustrated in Figures 3C and 4C is reached, where the portions 14B' of the terminals are gripped between the two sets of holes 61 and 202, and the hook-shaped portions 63 engage the underside of the printed-circuit board 200.

[0026] With reference just to Figures 4A-C, it should be noted how, in the passage from the free condition to the clamping condition, the portions 14B' of the terminals undergo deformation by bending so that their parts that traverse the two sets of the holes 61 and 202 are deflected from the main direction of extension of the terminals. In particular, in the example illustrated, the deformed parts of the terminals are received in the countersinking of the holes 61.

[0027] This enables exploitation of the elastic properties of the above portions, i.e., the elastic force exerted by these as a result of their deformation, tending to bring back the body 4 and the element 6 into their free condition in order to determine a contact pressure between the portions 14B' themselves and the electrical contacts present in the holes 202. The contact pressure thus determined guarantees that the contact between these parts is kept constant and stable even in the presence of vibrations and/or in the case of thermal jumps.

[0028] The elastic force exerted by the portions 14b' must in any case clearly be countered in order to keep the body 4 and the element 6 in the clamping condition. For this purpose, the connector 100 has clamping means provided on the casing 2 and designed to engage the body 4.

[0029] In various embodiments, as in the one illustrated (see Figures 1 and 2), these clamping means comprise at least one pair of opposed flexible tabs 22, which are provided on the wall 2A of the casing and project above the top edge thereof. On the respective mutually facing faces of these tabs, a projection 24 is provided, which identifies an inclined surface 24A, which faces the outside of the casing, and a contrast surface 24B, which faces the inside and is designed to engage a top edge 4' of the body 4.

[0030] During the movement of the body 4 described above for reaching the clamping condition, the body 4 presses on the surfaces 24A and keeps the two tabs 22 bent outwards. Once the clamping condition is reached, the body 4 passes beyond the projections 24, and the two tabs snap shut, bringing the surfaces 24B up against the edge 4' of the body 4. In this condition, the surfaces 24B act on the edge 4' to prevent the body 4 from returning into its raised position under the elastic action exerted by the portions 14B'.

[0031] In the light of the foregoing, it may thus be noted how the simple snap-action insertion of the body 4 into the casing 2 determines, on the one hand, fixing of the casing 2 to the printed-circuit board, by way of the hook-shaped portions 63 of the element 6, and on the other hand, electrical and mechanical connection between the terminals 14 and the holes 202 of the circuit, by way of the plate-like portion 6A once again of the clamping element 6.

[0032] In a way in itself known in the art, the printed-circuit board then envisages the usual paths (not illustrated) configured for distribution of the signals from the connector 100 to the other electronic components mounted on the circuit.

[0033] The casing 2, the body 4, and the clamping element 6 must clearly be made of an electrically insulating material, preferably a plastic or polymeric material, for example polybutylene terephthalate (PBT). However, they may present some portions made of metal, such as, for example, the hook-shaped portions 63, the pins 21, etc., with the advantage that these portions may also be of smaller dimensions than in the case where they are made of plastic material.

Claims

1. An electrical circuit comprising:

a printed-circuit board (200) having a first series of holes (202), and
a connector (100) comprising:

- a casing (2) designed to be coupled directly on the printed-circuit board (200); and
- a set of electrical terminals (14) inserted within said casing (2) and designed to couple with said first series of holes (202) made in said printed-circuit board (200), said circuit being **characterized in that** said connector (100) comprises:

- a body (4) designed to move within said casing (2) and on which said set of terminals (14) is fixed, where said terminals have projecting portions (14B') that project out of one side of said body (4) and are designed to couple with said holes (202) of said printed-circuit board, said first series of holes (202) of said printed-circuit board (200) receiving the projecting portions (14B') of the

electrical terminals of said connector;
- a clamping element (6) mounted within said casing (2), for gripping said portions (14B') of said terminals against edges of said holes (202) of said printed-circuit board; and
- cam means (64, 44, 44') provided on said body (4) and on said clamping element, which are configured for activating said clamping element (6) as a result of a movement of said body (4) within said casing (2).

2. The circuit according to Claim 1, wherein said cam means (64, 44, 44') are configured for inducing a displacement of said clamping element (6) towards a position for gripping said terminal portions as a result of a displacement of said body (4) in a first direction (Z), substantially parallel to the direction of extension of said terminals within said body, wherein said displacement of said clamping element (6) is in a second direction (Y), contained in a plane substantially orthogonal to said first direction (Z).

3. The circuit according to Claim 2, wherein said clamping element (6) comprises one or more hook-shaped portions (63) configured for fitting into corresponding openings (205) made in said printed-circuit board and for engaging the underside of said printed-circuit board, which is rendered accessible through said openings when said clamping element is in said gripping position.

4. The circuit according to Claim 3, wherein said cam means (64, 44, 44') are configured for inducing said displacement of said clamping element (6) as a result of the displacement of said body (4), with respect to said casing (2), from an extracted position to a retracted position.

5. The circuit according to Claim 4, wherein said casing (2) has means for preventing return of said body from said retracted position to said extracted position.

6. The circuit according to any one of the preceding claims, wherein said clamping element (6) has a plate-like portion (6A) having a series of through holes (61) that are each traversed by a corresponding portion of said projecting portions (14B') of said terminals.

7. The circuit according to any one of the preceding claims, wherein said cam means comprise a cam track (64) and a pin (44'), which slides in said cam track as a result of said displacement of said body (4).

8. The circuit according to Claim 6, wherein said cam means comprise a wall (6B) carried by said plate-like portion (6A) of said clamping element (6), and a slit (44), which is made in said body, on a side thereof facing said clamping element (6), and is designed to receive said wall, wherein a cam track (64) is provided on one between said wall (6B) and a side that delimits said slit (44), and wherein on the other between said wall (6B) and said side that delimits said slit (44) a pin (44') is provided, which slides in said cam track as a result of the movement of said body (4).

9. The circuit according to Claim 2, wherein said clamping element (6) is configured for pushing said portions (14B') of said terminals laterally during said displacement into said gripping position.

10. The circuit according to Claim 1, wherein said printed-circuit board has an opening (205) designed to receive the hook-shaped portion (63) of said connector (100), wherein said opening has a size such as to enable movement of said hook-shaped portion (63) so that it will engage a corresponding part of the underside of the printed-circuit board accessible through said opening (205).

11. The circuit according to Claim 1 or Claim 10, wherein said printed-circuit board has a second series of holes (201) designed to receive corresponding pins (21) provided on the underside of said casing.

Patentansprüche

1. Elektrische Schaltung, umfassend:

eine gedruckte Leiterplatte (200) mit einer ersten Reihe von Löchern (202) und einem Verbindungselement (100), umfassend:

- ein Gehäuse (2), das direkt mit der gedruckten Leiterplatte (200) verbunden wird; und
- einen Satz elektrischer Anschlussklemmen (14), die in das Gehäuse (2) eingefügt werden und dazu dienen, mit der in der gedruckten Schaltung (200) vorgesehenen ersten Reihe von Löchern (202) verbunden zu werden,

wobei die Schaltung **dadurch gekennzeichnet ist, dass** das Verbindungselement (100) folgendes umfasst:

- einen Körper (4), der in dem Gehäuse (2) bewegt wird und an dem der Satz Anschlussklemmen (14) befestigt wird, wobei die Anschlussklemmen vorkragende Abschnitte (14B') aufweisen, die an einer Seite

des Körpers (4) vorkragen und dazu dienen, mit den Löchern (202) der gedruckten Leiterplatte verbunden zu werden, wobei die erste Reihe von Löchern (202) der gedruckten Leiterplatte (200) die vorkragenden Abschnitte (14B') der elektrischen Anschlussklemmen des Verbindungselements aufnimmt;
- ein in dem Gehäuse (2) befestigtes Spannelement (6), das dazu dient, die Abschnitte (14B') der Anschlussklemmen an den Rändern der Löcher (202) der gedruckten Leiterplatte festzuspannen; und
- Nockenelemente (64, 44, 44'), die an dem Körper (4) und dem Spannelement vorgesehen sind und dazu dienen, das Spannelement (6) aufgrund einer Bewegung des Körpers (4) in dem Gehäuse (2) zu aktivieren.

2. Schaltung nach Anspruch 1, wobei die Nockenelemente (64, 44, 44') dazu dienen, aufgrund einer Verschiebung des Körpers (4) in einer ersten Richtung (Z), die im Wesentlichen parallel zu der Erstreckungsrichtung der Anschlussklemmen in dem Körper verläuft, eine Verschiebung des Spannelements (6) in Richtung einer Position zum Greifen der Klemmenabschnitte zu bewirken, wobei die Verschiebung des Spannelements (6) in eine zweite Richtung (Y) erfolgt, die in einer Ebene enthalten ist, die im Wesentlichen orthogonal zu der ersten Richtung (Z) verläuft.

3. Schaltung nach Anspruch 2, wobei das Spannelement (6) einen oder mehrere hakenförmige Abschnitte (63) umfasst, die in den entsprechenden, in der gedruckten Leiterplatte vorgesehenen Öffnungen (205) befestigt werden und in die Unterseite der gedruckten Leiterplatte eingreifen, die durch die Öffnungen zugänglich ist, wenn sich das Spannelement in der Greifposition befindet.

4. Schaltung nach Anspruch 3, wobei die Nockenelemente (64, 44, 44') dazu dienen, die Verschiebung des Spannelements (6) aufgrund einer Verschiebung des Körpers (4) in Bezug auf das Gehäuse (2) von einer ausgezogenen Position in eine eingezogene Position zu bewirken.

5. Schaltung nach Anspruch 4, wobei das Gehäuse (2) Vorrichtungen aufweist, die verhindern, dass der Körper von der eingezogenen Position in die ausgezogene Position zurückkehrt.

6. Schaltung nach einem der vorstehenden Ansprüche, wobei das Spannelement (6) einen plattenähnlichen Abschnitt (6A) mit einer Reihe von Durchstecklöchern (61) aufweist, die jeweils von einem entsprechenden Abschnitt der vorkragenden Abschnitte (14B') der Anschlussklemmen durchquert werden.

7. Schaltung nach einem der vorstehenden Ansprüche, wobei die Nockenelemente eine Nockenspur (64) und einen Stift (44') umfassen, der aufgrund der Verschiebung des Körpers (4) in die Nockenspur gleitet.

8. Schaltung nach Anspruch 6, wobei die Nockenelemente eine Wand (6B) umfassen, die von dem plattenähnlichen Abschnitt (6A) des Spannelements (6) getragen wird, und einen Spalt (44), der in dem Körper auf einer dem Spannelement (6) zugewandten Seite vorgesehen ist und zur Aufnahme der Wand (6B) dient, wobei an der Wand (6B) oder einer Seite, welche den Spalt (44) begrenzt, eine Nockenspur (64) vorgesehen ist, wobei an dem jeweils anderen Element, der Wand (6B) oder der Seite, die den Spalt (44) begrenzt, ein Stift (44') vorgesehen ist, der aufgrund der Bewegung des Körpers (4) in die Nockenspur gleitet.

9. Schaltung nach Anspruch 2, wobei das Spannelement (6) dazu dient, die Abschnitte (14B') der Anschlussklemmen während der Verschiebung in die Greifposition seitlich zu drücken.

10. Schaltung nach Anspruch 1, wobei die gedruckte Leiterplatte eine Öffnung (205) aufweist, die zur Aufnahme des hakenförmigen Abschnitts (63) des Verbindungselements (100) dient, wobei die Größe der Öffnung so bemessen ist, dass sie die Bewegung des hakenförmigen Abschnitts (63) ermöglicht, so dass dieser in einen entsprechenden Teil der Unterseite der gedruckten Leiterplatte eingreift, die durch die Öffnung (205) zugänglich ist.

11. Schaltung nach Anspruch 1 oder Anspruch 10, wobei die gedruckte Leiterplatte ein zweite Reihe von Löchern (201) aufweist, die zur Aufnahme der entsprechenden, an der Unterseite des Gehäuses vorgesehenen Stifte (21) dienen.

Revendications

1. Circuit électrique comprenant :

une carte de circuits imprimés (200) pourvue d'une première série de trous (202), et
un connecteur (100) comprenant:

- un boîtier (2) conçu pour être couplé directement sur la carte de circuits imprimés (200) ; et
- un ensemble de bornes électriques (14)

insérées dans ledit boîtier (2) et conçues pour être couplées à ladite première série de trous (202) formés dans ladite carte de circuits imprimés (200),

ledit circuit étant **caractérisé en ce que** ledit connecteur (100) comprend :

- un corps (4) conçu pour se déplacer à l'intérieur dudit boîtier (2) et sur lequel est fixé ledit ensemble de bornes (14), lesdites bornes présentant des parties en saillie (14B') qui dépassent d'un côté dudit corps (4) et sont conçues pour être couplées auxdits trous (202) de ladite carte de circuits imprimés, ladite première série de trous (202) de ladite carte de circuits imprimés (200) recevant les parties en saillie (14B') des bornes électriques dudit connecteur ;
- un élément de serrage (6) monté à l'intérieur dudit boîtier (2) pour serrer lesdites parties (14B') desdites bornes contre des bords desdits trous (202) de ladite carte de circuits imprimés ; et
- des moyens de came (64, 44, 44') prévus sur ledit corps (4) et sur ledit élément de serrage, qui sont configurés pour activer ledit élément de serrage (6) en conséquence d'un mouvement dudit corps (4) à l'intérieur dudit boîtier (2).

2. Circuit selon la revendication 1, dans lequel lesdits moyens de came (64, 44, 44') sont configurés pour induire un déplacement dudit élément de serrage (6) vers une position permettant le serrage desdites parties de bornes en conséquence d'un déplacement dudit corps (4) dans une première direction (Z), sensiblement parallèle à la direction d'extension desdites bornes à l'intérieur dudit corps, dans lequel ledit déplacement dudit élément de serrage (6) s'effectue dans une seconde direction (Y), contenue dans un plan sensiblement orthogonal à la première direction (Z).

3. Circuit selon la revendication 2, dans lequel ledit élément de serrage (6) comprend une ou plusieurs parties en forme de crochet (63) configurées pour s'insérer dans des ouvertures correspondantes (205) formées dans ladite carte de circuits imprimés et pour s'engager dans la face inférieure de ladite carte de circuits imprimés, qui est rendue accessible à travers lesdites ouvertures lorsque ledit élément de serrage est dans ladite position de serrage.

4. Circuit selon la revendication 3, dans lequel lesdits moyens de came (64, 44, 44') sont configurés pour induire ledit déplacement dudit élément de serrage (6) en conséquence du déplacement dudit corps (4), par rapport audit boîtier (2), d'une position sortie à une position rétractée.

5. Circuit selon la revendication 4, dans lequel ledit boîtier (2) comporte des moyens pour empêcher le retour dudit corps de ladite position rétractée vers ladite position sortie.

6. Circuit selon l'une quelconque des revendications précédentes, dans lequel ledit élément de serrage (6) présente une partie en forme de plaque (6A) pourvue d'une série de trous traversants (61) qui sont chacun traversés par une partie correspondante desdites parties en saillie (14B') desdites bornes.

7. Circuit selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens de came comprennent un chemin de came (64) et une tige (44') qui coulisse dans ledit chemin de came en conséquence dudit déplacement dudit corps (4).

8. Circuit selon la revendication 6, dans lequel lesdits moyens de came comprennent une paroi (6B) portée par ladite partie en forme de plaque (6A) dudit élément de serrage (6), et une fente (44) qui est formée dans ledit corps, sur un côté de celui-ci situé en regard dudit élément de serrage (6), et est conçue pour recevoir ladite paroi, dans lequel un chemin de came (64) est prévu, d'une part, entre ladite paroi (6B) et un côté qui délimite ladite fente (44), et dans lequel d'autre part est prévue, entre ladite paroi (6B) et ledit côté qui délimite ladite fente (44), une tige (44') qui coulisse dans ledit chemin de came en conséquence du mouvement dudit corps (4).

9. Circuit selon la revendication 2, dans lequel ledit élément de serrage (6) est configuré pour pousser lesdites parties (14B') desdites bornes latéralement pendant ledit déplacement dans ladite position de serrage.

10. Circuit selon la revendication 1, dans lequel ladite carte de circuits imprimés comporte une ouverture (205) conçue pour recevoir la partie en forme de crochet (63) dudit connecteur (100), dans lequel ladite ouverture a une dimension permettant le mouvement de ladite partie en forme de crochet (63) de façon que celle-ci s'engage dans une partie correspondante de la face inférieure de la carte de circuits imprimés accessible à travers ladite ouverture (205).

11. Circuit selon la revendication 1 ou 10, dans lequel ladite carte de circuits imprimés comporte une seconde série de trous (201) conçus pour recevoir des tiges correspondantes (21) prévues sur la face inférieure dudit boîtier.

FIG. 1

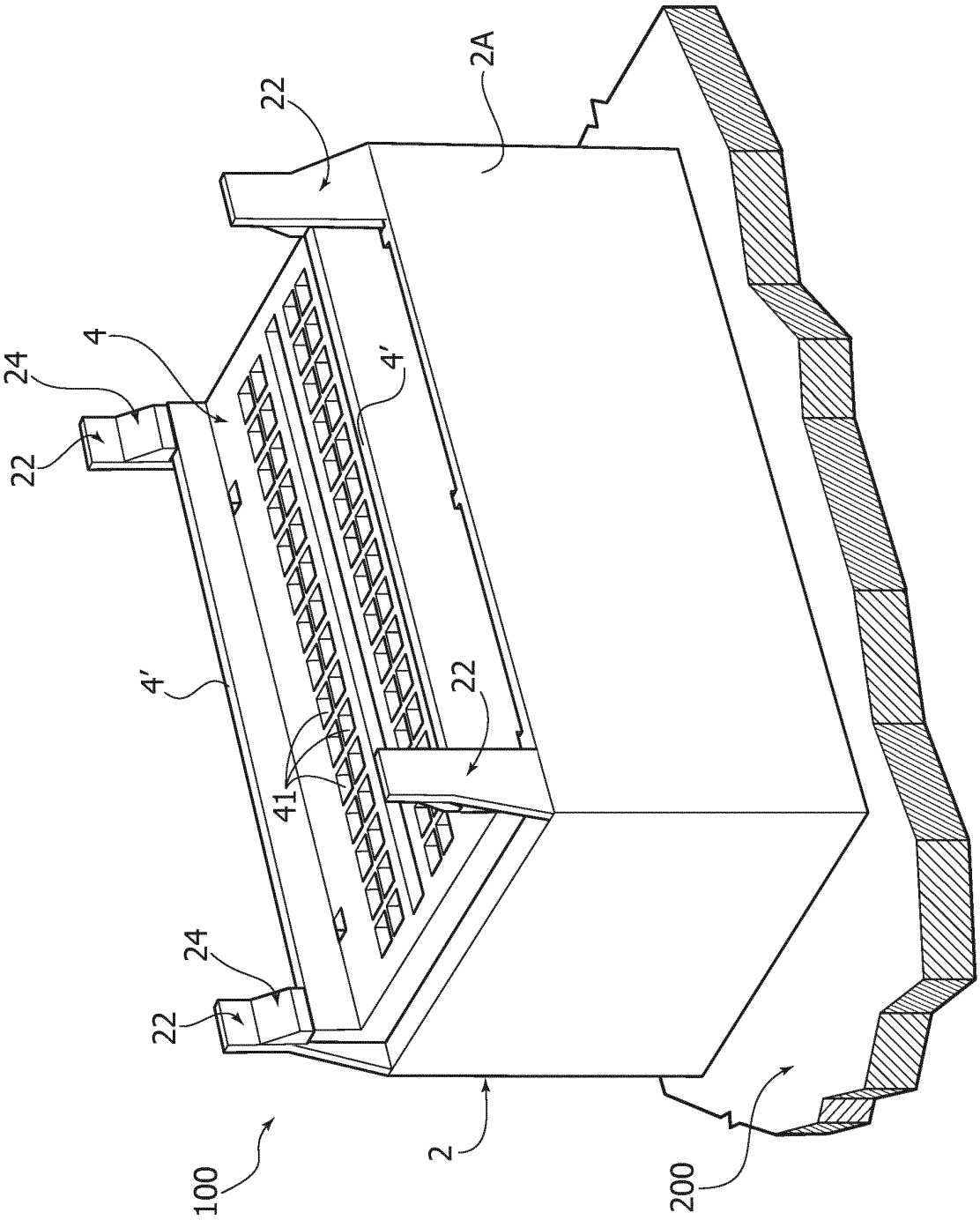
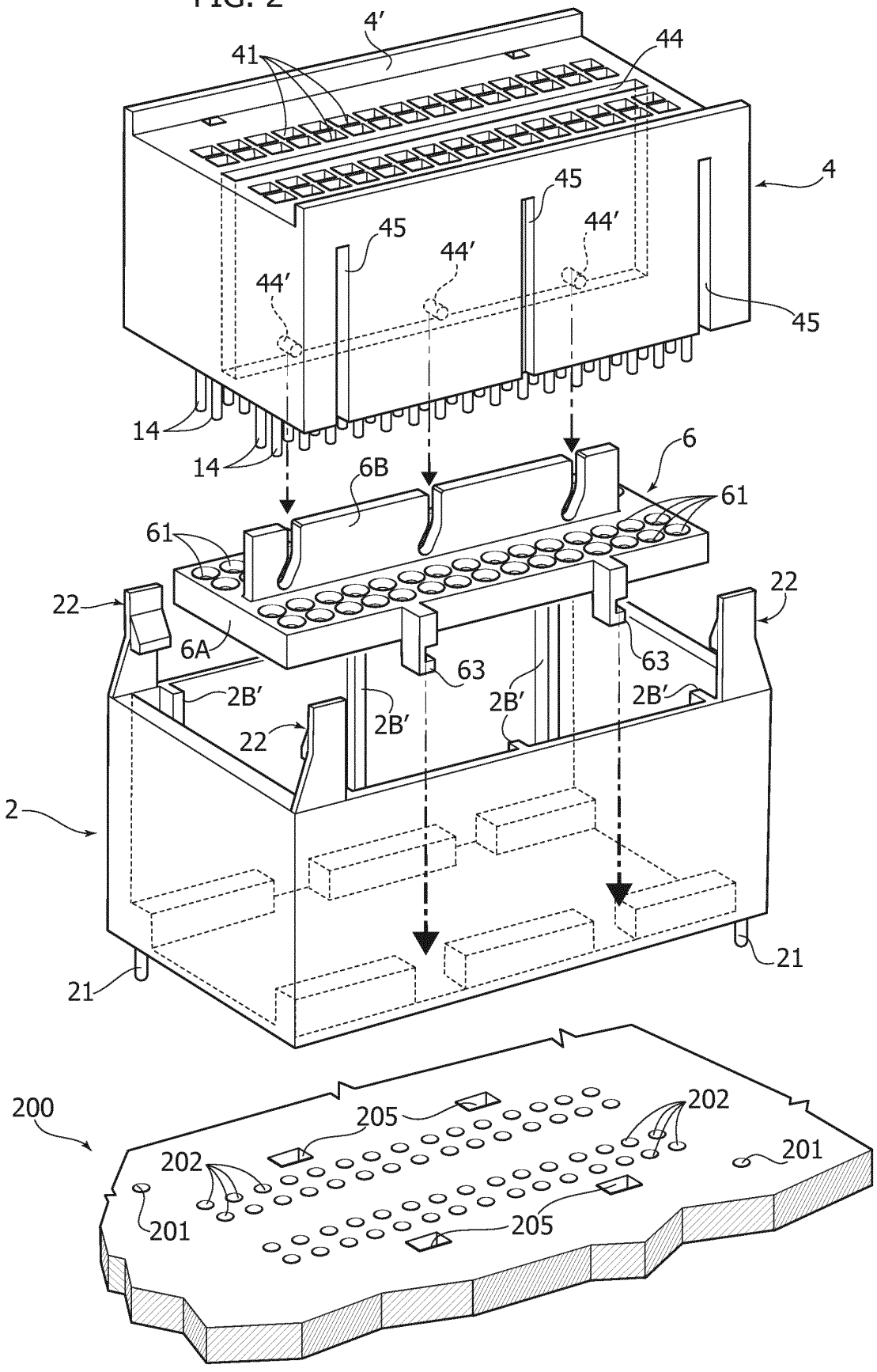


FIG. 2


4'
41
44
4
45
45
44'
44'
44'
45
14
14
6
6B
61
61
22
22
6A
63
63
2B'
2B'
2B'
2B'
22
2
21
21
200
205
202
202
201
201
205

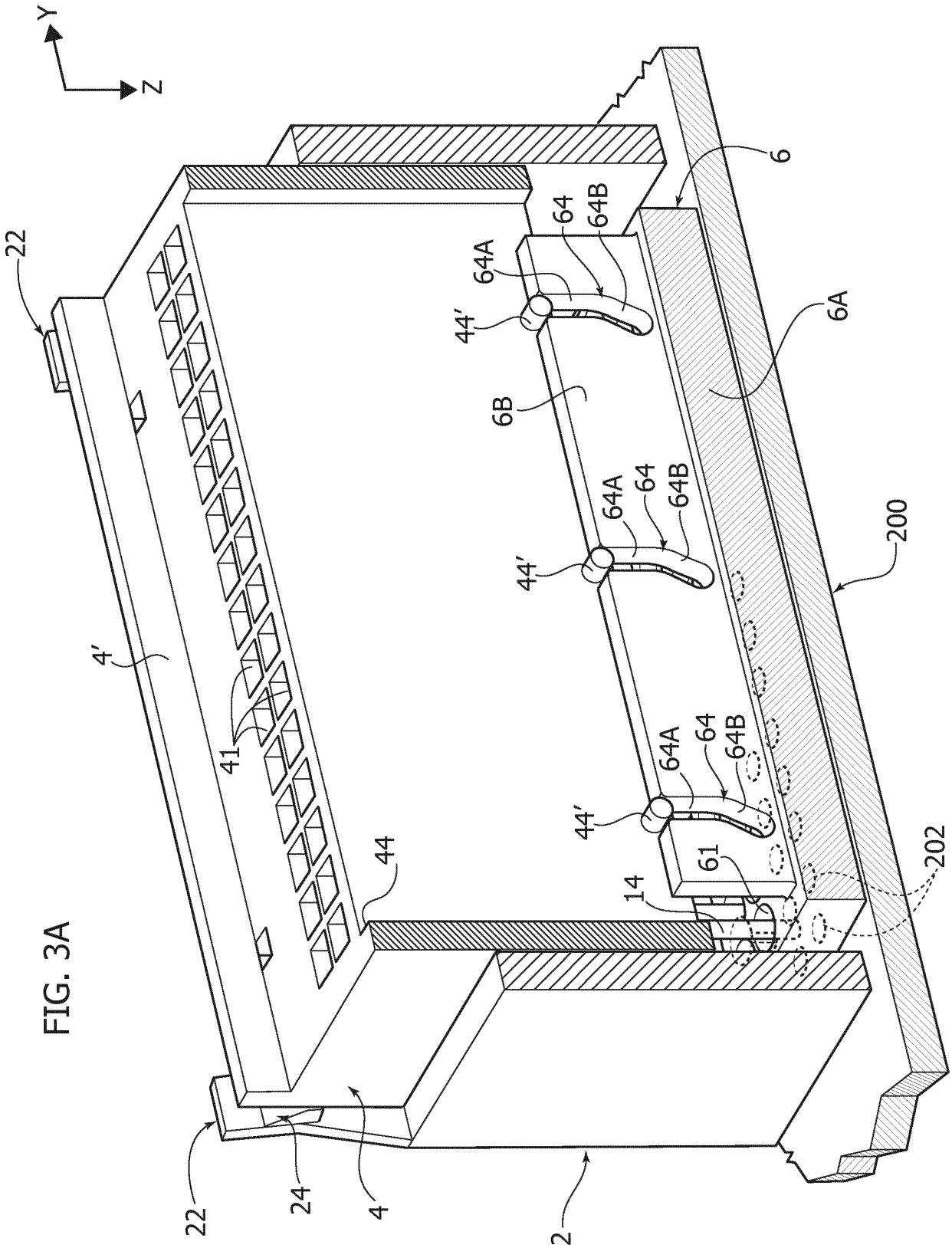

Y
Z
22
6
64
64B
64A
44'
6A
6B
64A
64
64B
44'
200
4'
41
64A
64
64B
44'
202
61
14
44
22
24
4
2

FIG. 3A

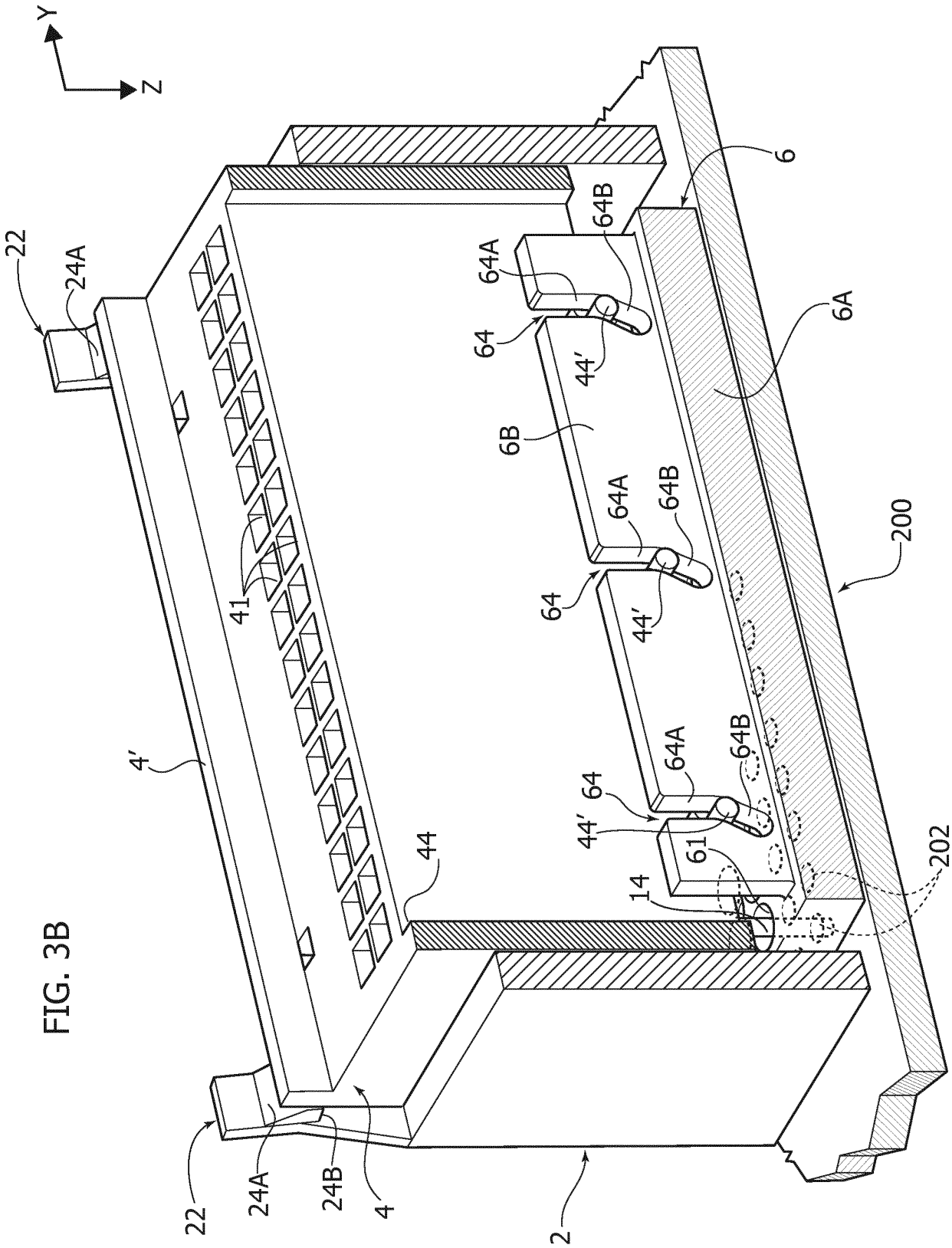


FIG. 3B

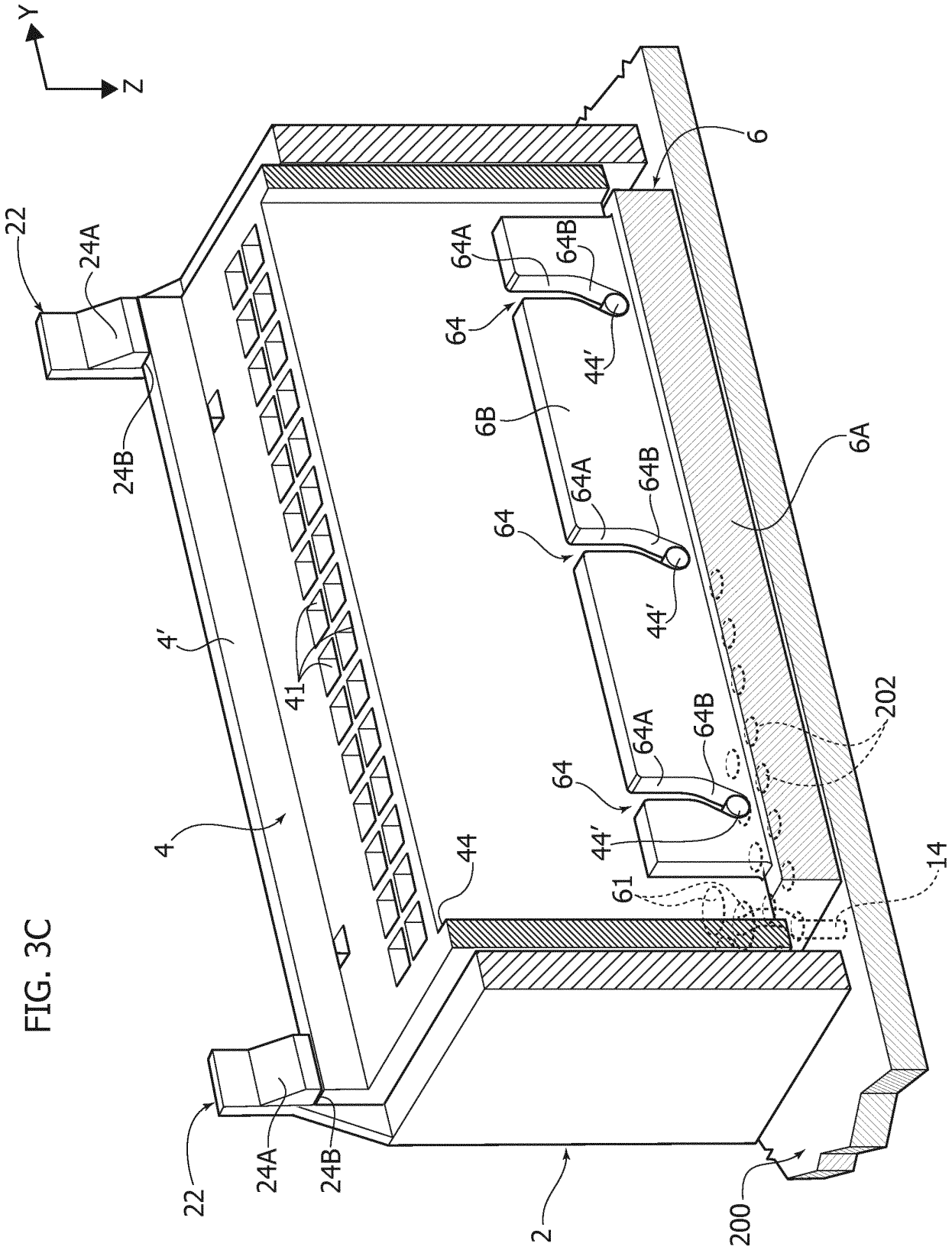


FIG. 3C

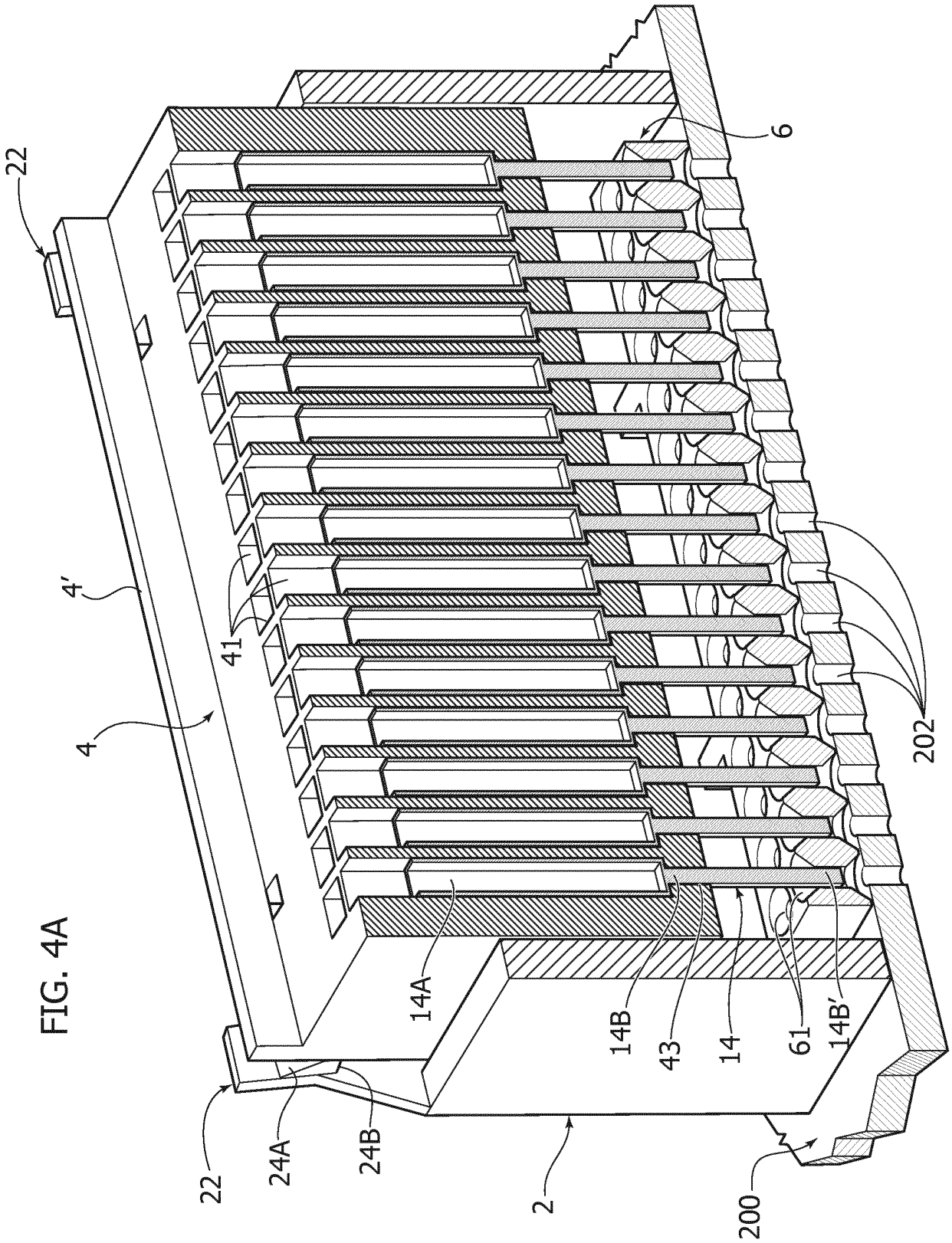


FIG. 4A

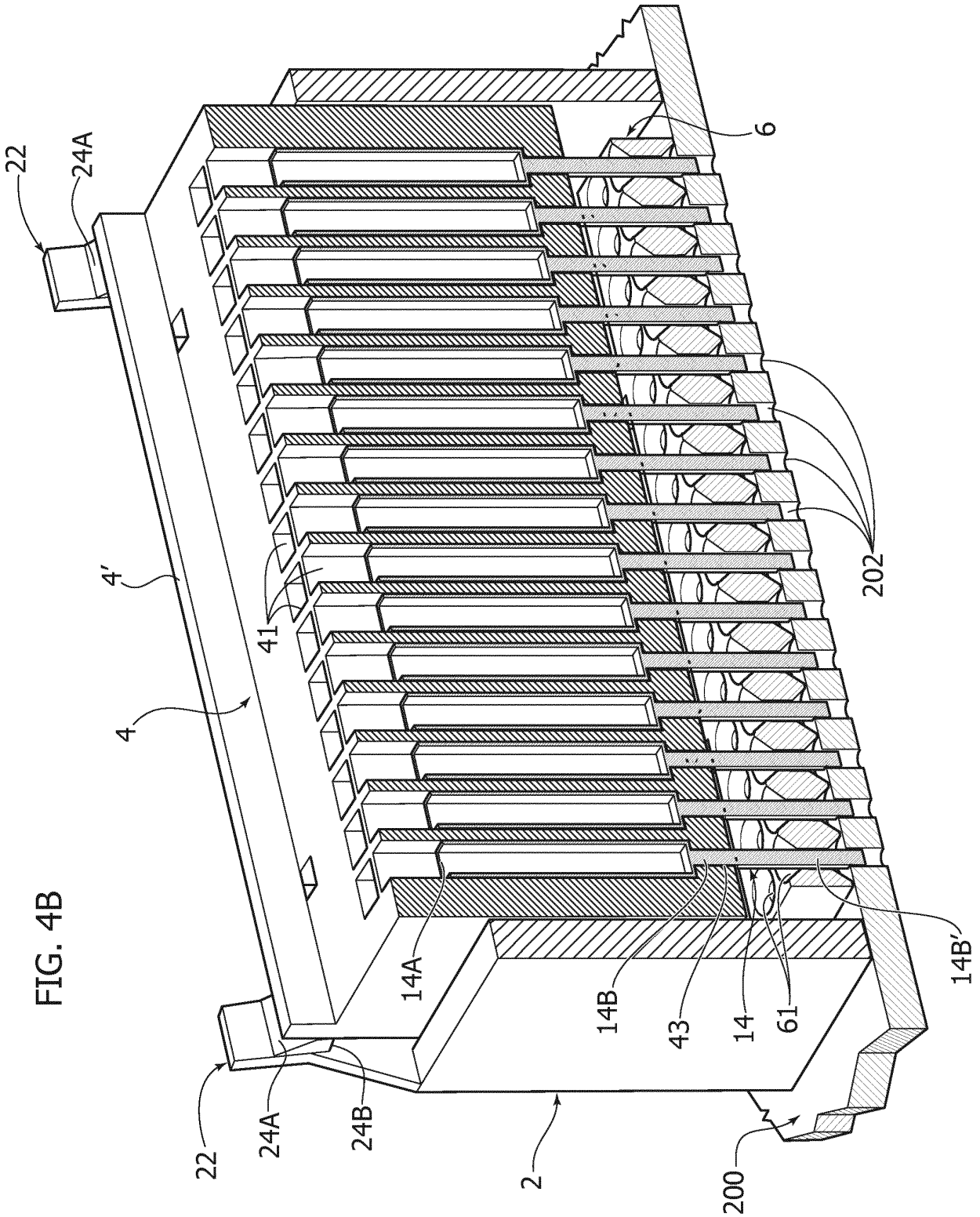


FIG. 4B

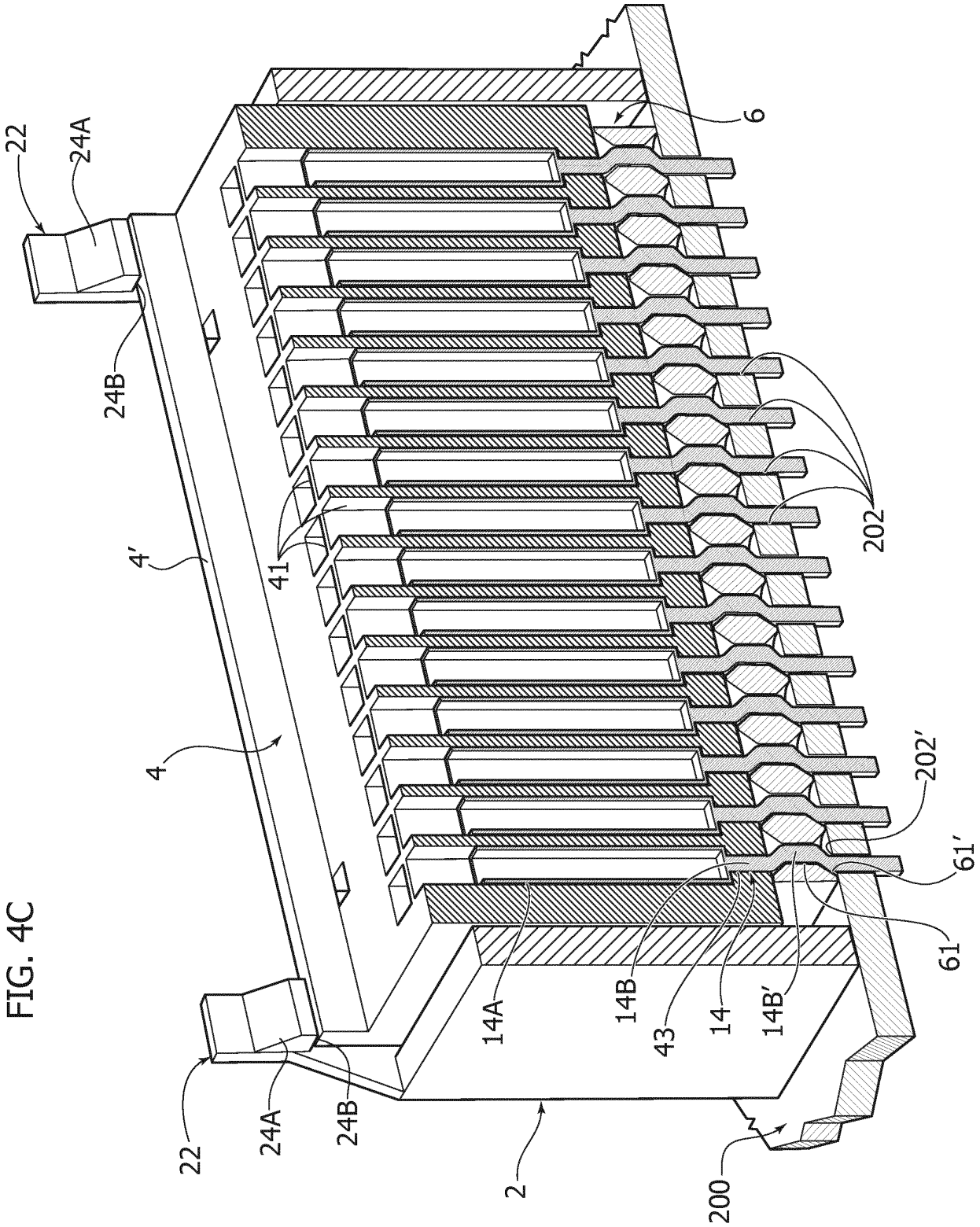
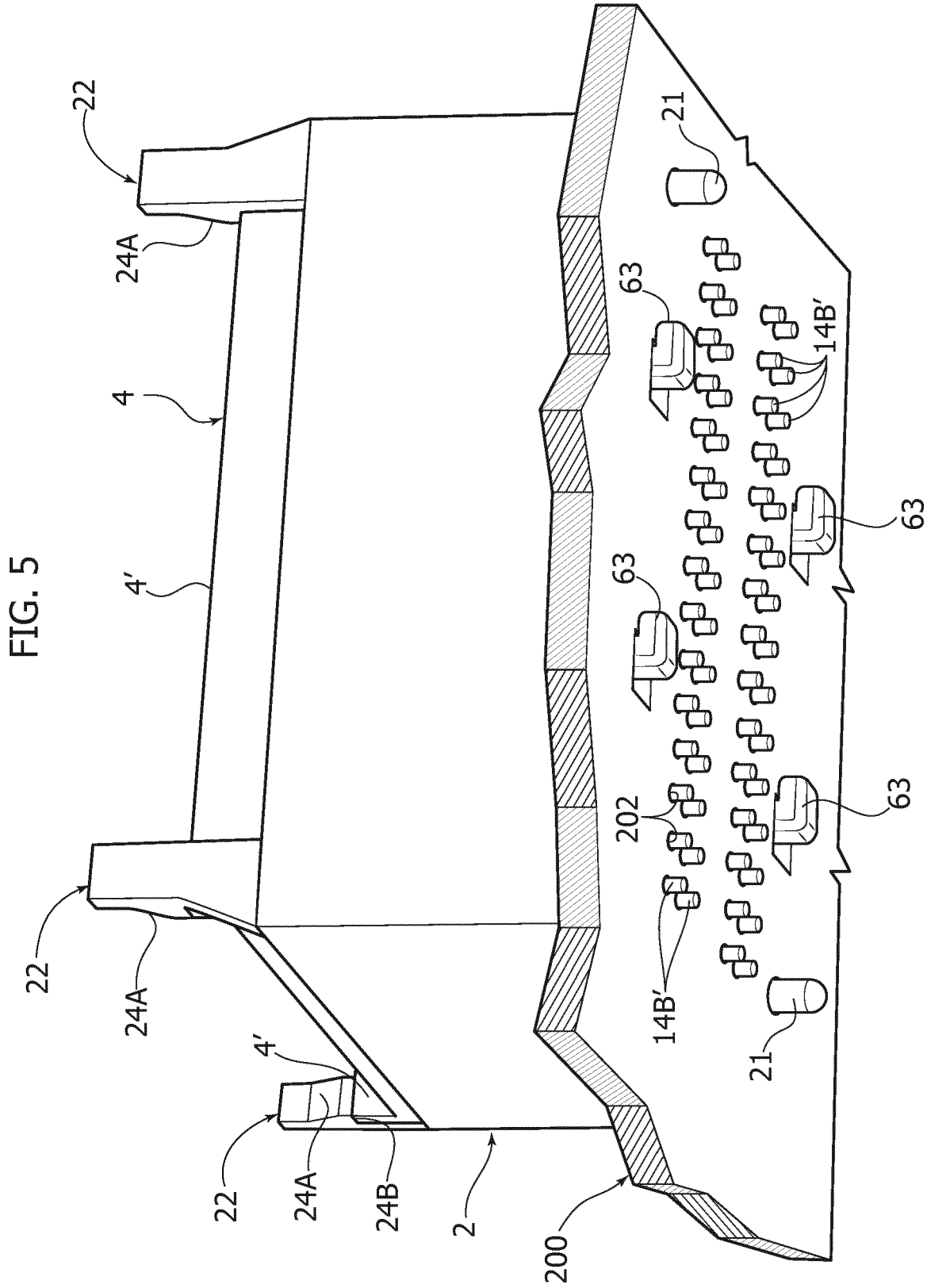


FIG. 4C

FIG. 5



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Patent documents cited in the description

- EP 0527578 A1 **[0002]**