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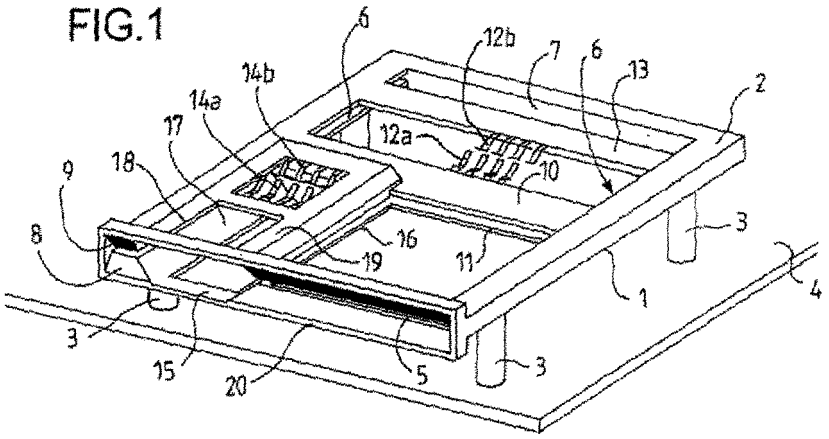
(54) Connector for removable circuit support

(57) Connector (1) for removable support (A, B) characterized in tha t it comprises:

- a first series of contacts (12a, 12b) designed to collaborate with a first circuit support (A);
- a second series of contacts (14a, 14b), of the same type as the first series of contacts (12a, 12b), designed to collaborate with a second circuit support;
- electrical links between the corresponding contacts of the first and second series;
- first guiding elements (5, 6, 7, 8, 9, 10, 11) for inserting the first support in the connector;
- second guiding elements (10, 11, 15, 16, 17, 18, 19) for inserting the second support in the connector.

FIG.1



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Description

[0001] The invention relates to a connector for removable circuit support, typically a chip card or chip key, capable of receiving supports of different sizes. The invention can be used in particular within the context of a pay-per-view television system or as part of a network of devices with secured content distribution, in particular audiovisual.

[0002] Connectors designed to receive different types of removable memory card or chip card type supports are known. Generally, the c onfiguration of these connectors is designed to bring the contacts of the connector into contact with the corresponding contacts of the support, whatever the support, and in particular whatever the dimensions of this support.

[0003] The inventors have been subje ct to certain constraints in the design of a connector.

[0004] The subject of the invention is a connector for removable support characterized in that it comprises:

- a first series of contacts designed to collaborate with a first circuit support;
- a second series of contacts of the same type as the first series of contacts, designed to collaborate with a second circuit support;
- electrical links between the corresponding contacts of the first and second series;
- first guiding elements for inserting the first support in the connector;
- second guiding elements for inserting the second support in the connector.

[0005] Other advantages of the invention will become apparent from the description of a particular non -limiting exemplary embodiment, illustrated by the appended figures, in which:

Figure 1 represents a perspective view of the connector according to the exemplary embodiment;
Figure 2 represents the connector of Figure 1, in which a microprocessor key has been inserted;
Figure 3 represents the connector of Figur e 1, in which a chip card has been inserted;
Figures 4 to 11 are different views of the connector according to the present example.

[0006] Figure 1 illustrates the connector 1 according to the present exemplary embodiment, which concerns a pay -per-view televisio n receiver. This connector is designed to receive alternatively either a chip card A or a chip key B. However, it can be used with any removable memory circuit or microprocessor circuit support.

[0007] The insertion of the chip card prevents the insertion of the microprocessor card, and vice-versa.

[0008] This connector comprises a rectangular frame 2 supported by posts 3 designed to secure it on a support 4. In the present example, this support is a printed circuit board, but the connector can also be fixed directly to the casing of the device.

[0009] The frame comprises an insertion slot 5, the minimum height of which is slightly greater than that of the chip card A, so as to allow its insertion without force while limiting the play between the card and the connector. The con nector is placed on its support so that the slot 5 is flush with an opening, not illustrated, in the casing of the device, for access by the user.

[0010] To facilitate the insertion of the card A in the slot, the latter includes , at the point where the connector is flush with the casing, two inclined planes 8 and 9 forming a flaring of the slot towards the outside of the casing and causing the edge of the card to slip towards the slot when placed on one of these surfaces.

[0011] The frame of the connector is hollowed out and includes, on either side of the slot, guiding grooves 6 designed to guide the card to its final position, and to hold it laterally and vertically. The rear internal wall 7 of the frame serves as an end-of-travel stop for the card.

[0012] The frame includes a pair of crossmembers 10 and 11 respectively linking the top and bottom parts of the lateral sides of the frame forming the grooves. The purpose of the crossmembers is to make the frame rigid, guide the card in the same way as the grooves, and, for one of the crossmembers, serve as a support for a first series of contacts 12a. The conta cts 12a comprise four individual resilient-blade contacts in the form of a V, one branch of which is maintained by the crossmember 10 and the other branch of which is free. A second series of contacts 12b is fixed to a top crossmember 13 located near the stop 7. The contacts are linked to electronic circuits not shown, for example circuits compliant with the ISO 7816 standard.

[0013] When the card is inserted in the connector, its front edge strikes an inclined face of each contact, the effect of which is to raise the contacts when the card is inserted further forward. The latter includes an area of eight corresponding flat contacts which, when the card is in the end -stop position, are positioned under the contacts 12a and 12b and collaborate with same. The contacts of the card are linked to the internal circuits of the card, in other words , a microprocessor and/or memory and/or other electronic circuits. The deformation of the conta cts due to the raising action generates a pressure which ensures that the point of each contact bears on the card. The vertical pressure of the contacts maintains the card, but also ensures an electrical contact by scratching by friction on any layers of o xides or other compounds present.

[0014] Conventionally, an end -stop contact, not illustrated, is provided, designed to generate a signal indicating the presence of a card when the latter is positioned in its operating position inside the connector.

[0015] The travel of the card inside the casing due to the distance between the inlet of the slot and the end -stop 7 is designed so that, once in the end-stop position, the card projects by a certain length from the slot. The

minimum projection length is typically chosen to provide a handling area that is sufficient for the user to remove the card as necessary. The maximum project ion length is chosen to ensure, in the event of accidental impact, typically if brushed by the user, that the card remains in the connector. Typically, the length is one centimetre.

[0016] The configuration of the casing of the device - in particular the position of the slot relative to the access aperture in the casing - will be taken into account in determining the projection length.

[0017] According to the exemplary embodiment, the contacts of the card are placed equidistant from the lateral edges, but this is not mandatory. Different positions are allowed by the current standards. Moreover, the card can also be a PCMCIA card - the contacts of the connector wil l then be of appropriate type and positioned accordingly.

[0018] The connector furthermore comprises two other series of contacts 14a and 14b designed to collaborate with the flat contacts of a chip key B. This key B comprises a body having a thickness greater t han that of the card A - for example twice or three times its thickness - and a head having a width greater than that of the body of the key and serving as a gripping area. The body of the key is not necessarily thicker than the card over its entire area; only a few guiding elements of the body need to be: for example the lateral edges or just one of them: the guiding elements in the frame of the connector will have to be designed accordingly, as will the placement height of the contacts 14a and 14b.

[0019] According to the present exemplary embodiment, the flat contacts of the key are disposed on the top surface of the key, roughly at its end, but can be of different type or have a different position.

[0020] The slot 5 comprises an area 15 in which it has a minimum thickness slightly greater than that of the key B. This additional width can advantageously be formed in the planes 8 and 9, such that the slot 5 is surrounded by a continuous frame 20. The width of the area corresponds to that of the key so as to allow its insertion. The frame has, along the ar ea 5 in the direction of insertion of the key, bottom lateral guides 16, 17 and top lateral guides 18, 19, forming a cavity having roughly the shape of the key body. Advantageously, the area 15 is placed such that the co ntacts 14a and 14b are laterally offset relative to the contacts 12a and 12b, so as to prevent the contacts of the card being scratched by the contacts 14a and 14b. However, this may not be a problem if the contacts 14a and 14b are raised, given the greate r thickness of the key according to the present embodiment.

[0021] Advantageously, the crossmembers 10 and 11 are placed so as to form an end-stop for the end of the key B in its operating position. However, the key can also come to its end -stop position by its head at the slot level, or by its thickness, or by its width relative to the area 15.

[0022] The end-stop is designed so that the grippable part of the key projects from the slot by at least a minimum length.

[0023] The contacts 14a and 14b are placed on crossmembers linking the top lateral guides 18 and 19. The contacts 14a and 14b are of the same type as the contacts 12a and 12b. According to the present exemplary embodiment, the corresponding individual contacts are electrically linked (this is not shown in the diagrams). An end-of-travel contact is also provided.

[0024] In the exemplary embodiment, the key has a length less than that of the card, but it can have a longer length.

[0025] The invention can be used to combine two connectors so that the area presented on the front p anel by the connector at its slot level is roughly equal to that of the largest connector, in other words, in the present case, that of the card.

[0026] Unlike the prior art, the contacts are duplicated so as to allow the insertion of keys and/or cards having different lengths while presenting, once inserted, suitable gripping areas. However, the additional cost is limited to the contacts 14a and 14b and to the electrical links with the contacts 12a and 12b.

[0027] Moreover, the insertion of the key mechanically prevents the insertion of the card, and vice-versa. Consequently, there is no need to provide discrimination means which would have been essential if two separate connectors had been incorporated.

[0028] In other words, the capacity of the overall connector is improved.

Claims

1. Connector (1) for removable support (A, B) **characterized in that** it comprises:

- a first series of contacts (12a, 12b) designed to collaborate with a first circuit support (A);
- a second series of contacts (14a, 14b) , of the same type as the first series of contacts (12a, 12b), designed to collaborate with a second circuit support;
- electrical links between the corresponding contacts of the first and second series;
- first guiding elements (5, 6, 7, 8, 9, 10, 11) for inserting the first support in the connector;
- second guiding elements (10, 11, 15, 16, 17, 18, 19) for inserting the second support in the connector.

2. Connector according to Claim 1, **characterized in that** the second support (B) is narrower and thicker than the first support (A) and **in that** the connector includes separate end -of-travel stops (7, 10, 11) for each support so as to leave a projecting gripping area having a common predetermined maximum projection length.

3. Connector according to either of Claims 1 and 2,

characterized in that the first and second series of contacts are perpendicularly offset in the direction of insertion of the supports.

4. Connector according to one of Claims 1 to 3, **characterized in that** the frame has an access slot (5) for inserting the first support and lateral grooves for guiding the first support which are formed in the lateral edges of the frame.

5. Connector according to Claim 2, **characterized in that** the end -of-travel stop of the second support (10) comprises a crossmember supporting contacts (12a, 12b) for the first support.

6. Connector according to Claim 4 together with Claim 2, **characterized in that** the slot is provided with an aperture area (15) that is higher than and roughly the same width as the second support.

7. Connector according to one of the Claims 1 to 6, wherein the second guiding elements are included within the frame defined by the first guiding elements.

FIG.1

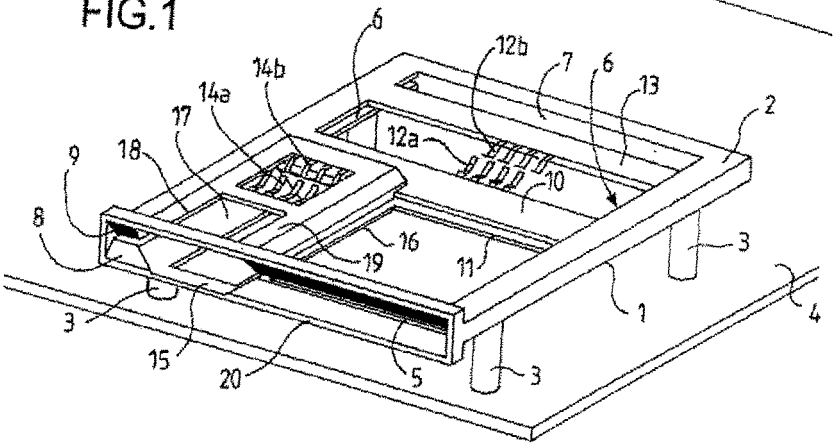


FIG.2

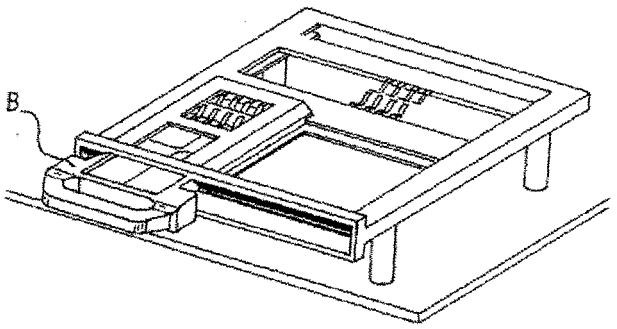
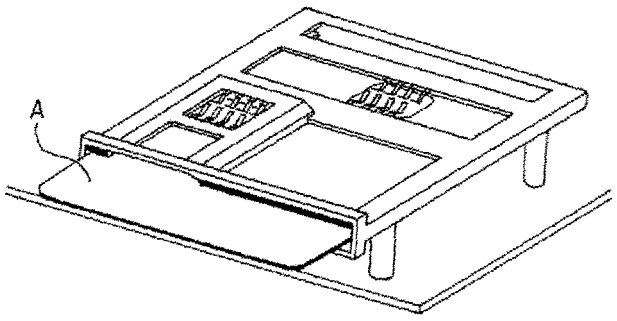


FIG.3



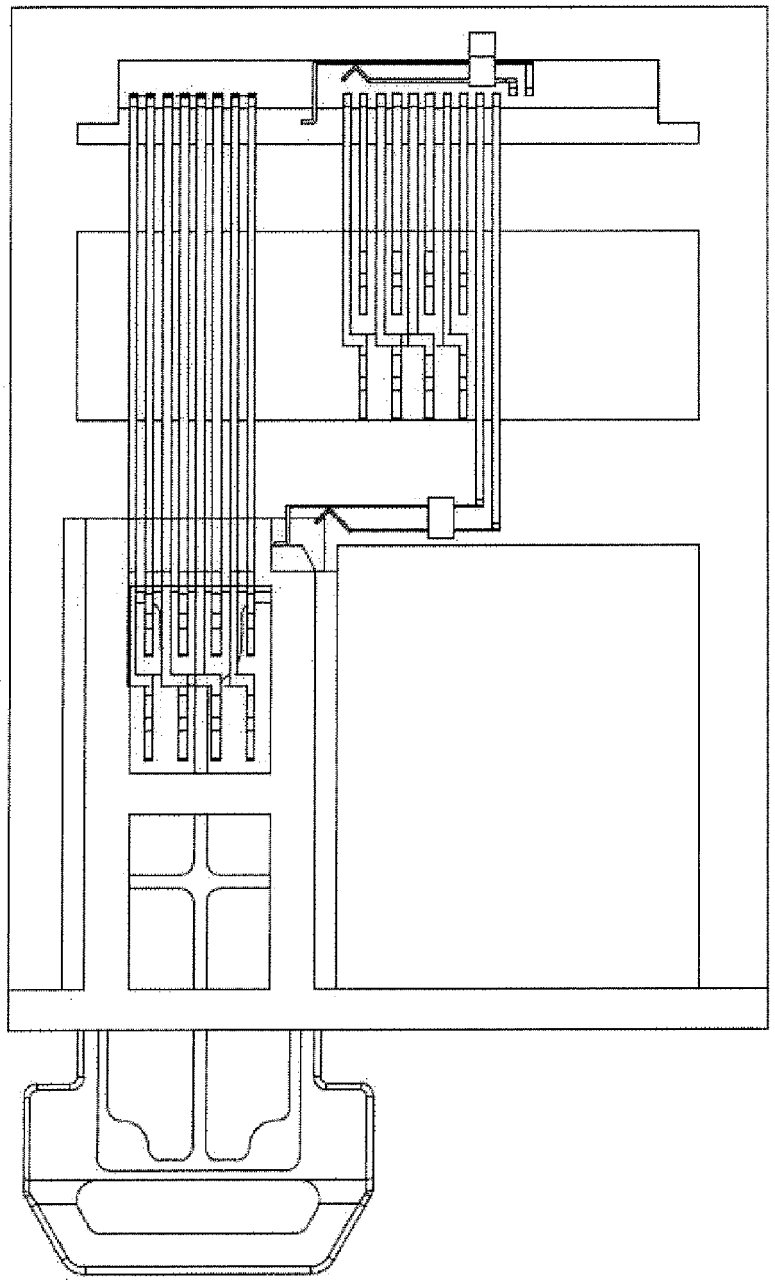


Fig. 4

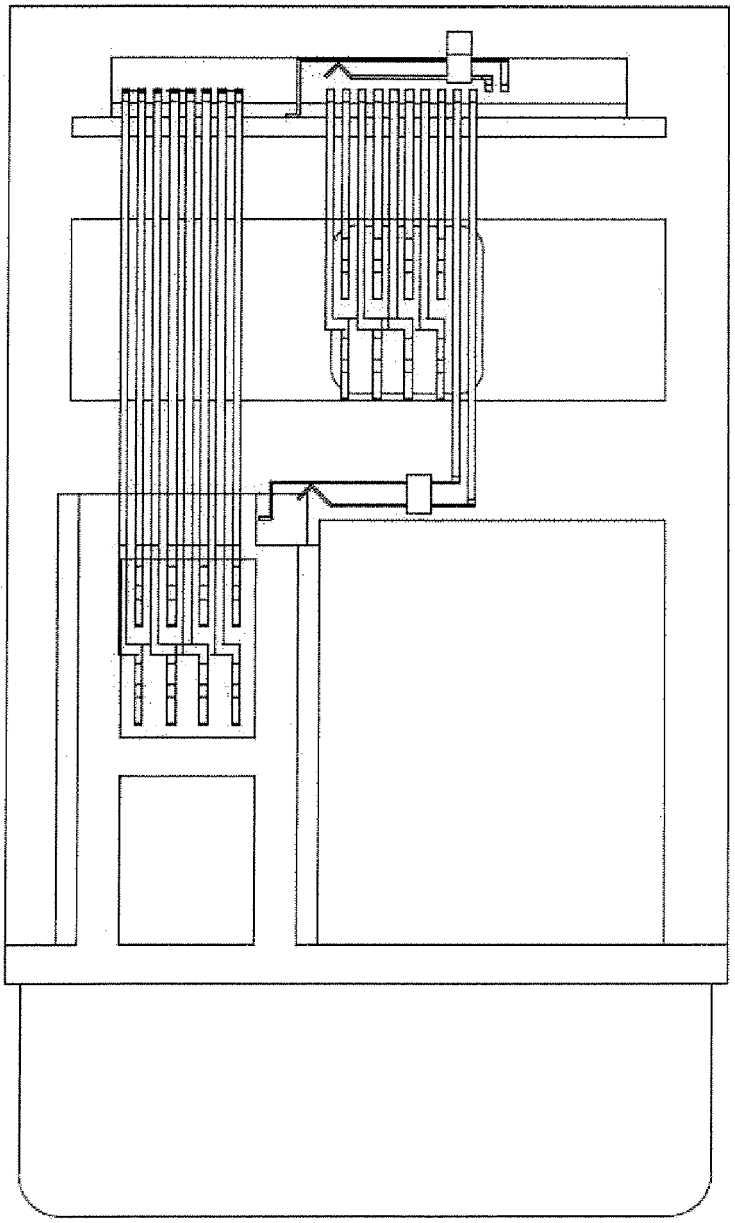


Fig. 5

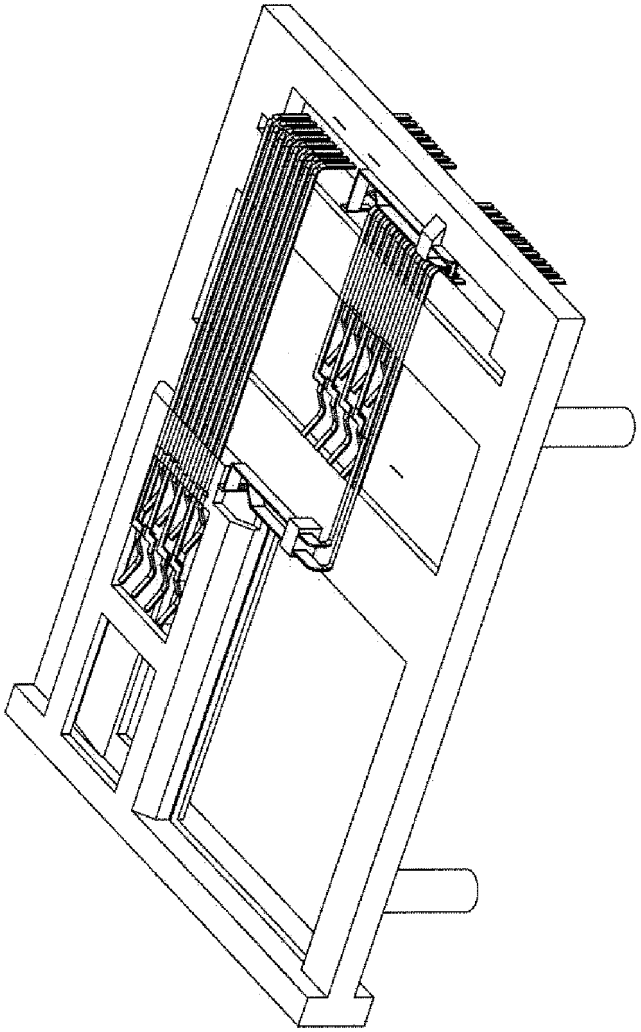


Fig. 6

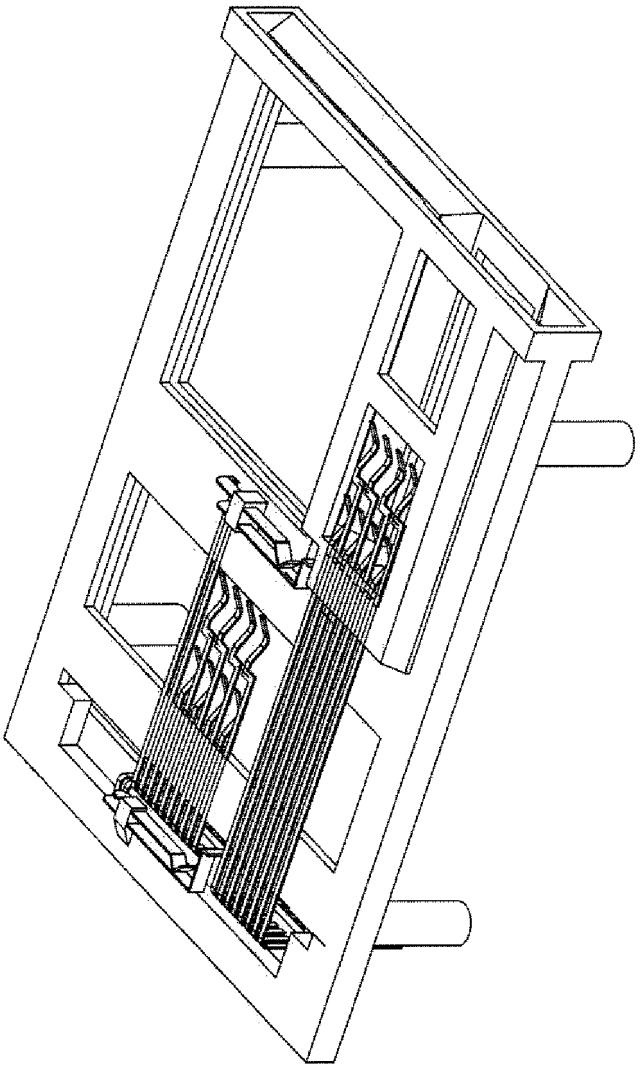


Fig. 7

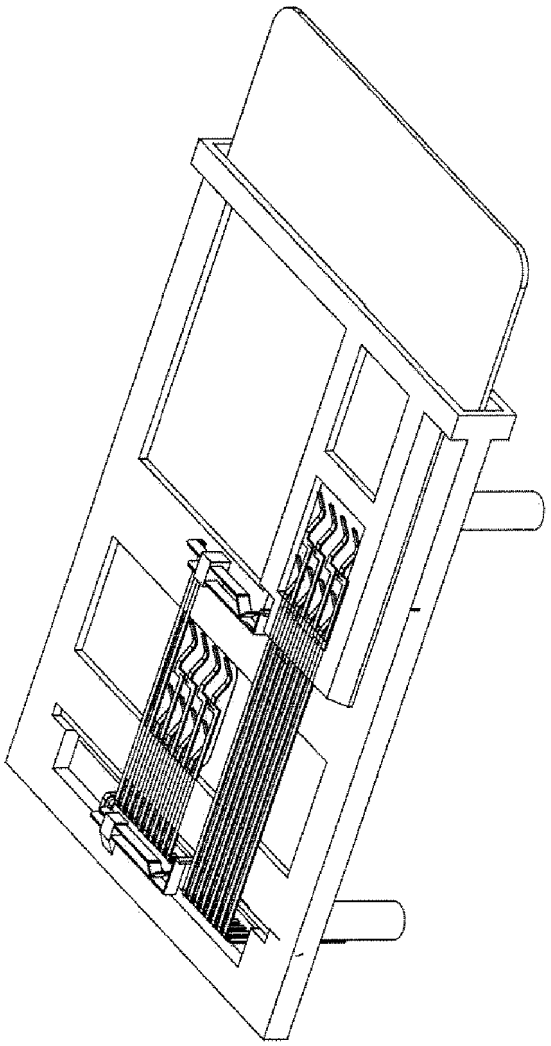


Fig. 8

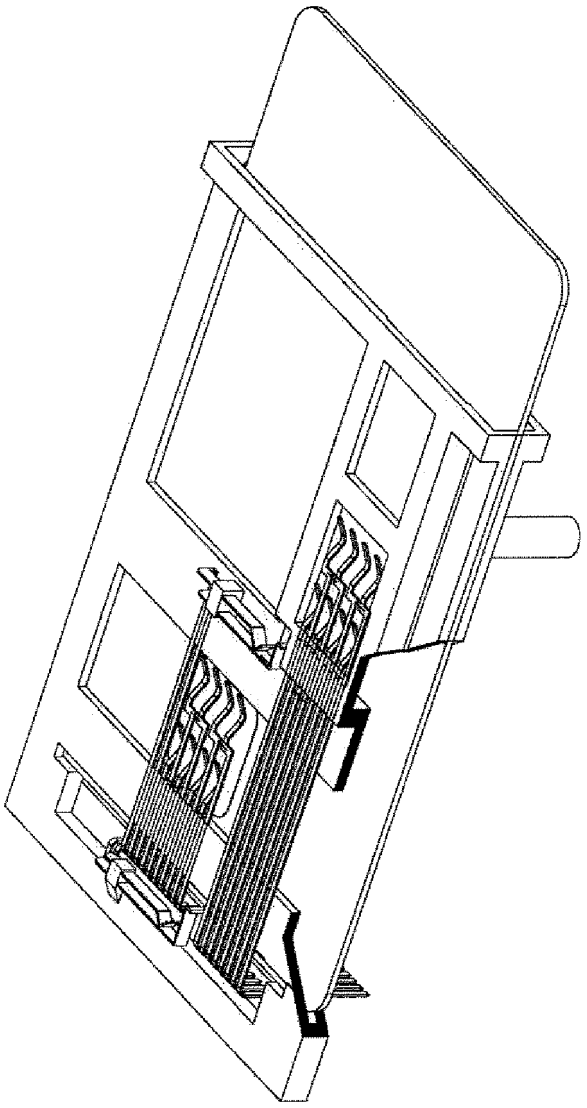


Fig. 9

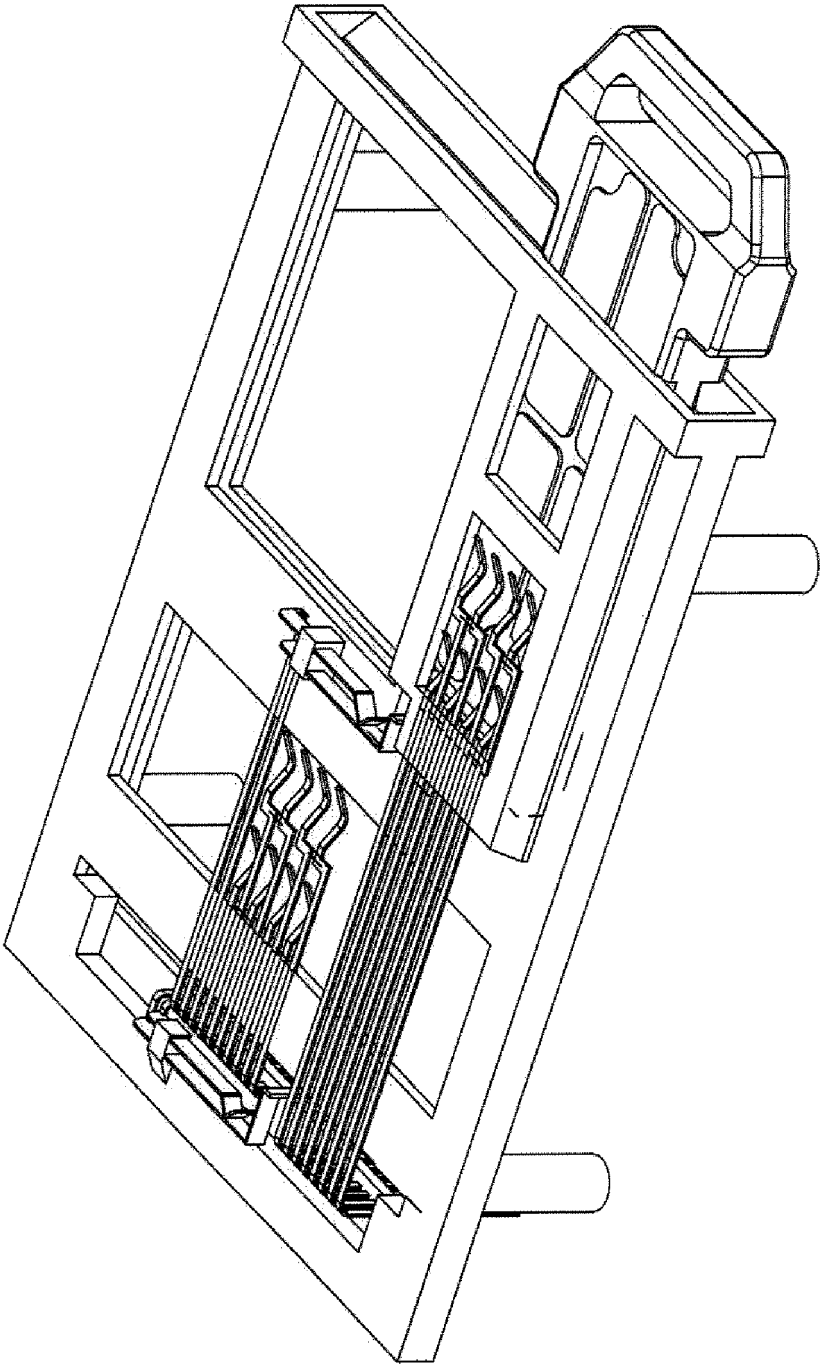


Fig. 10

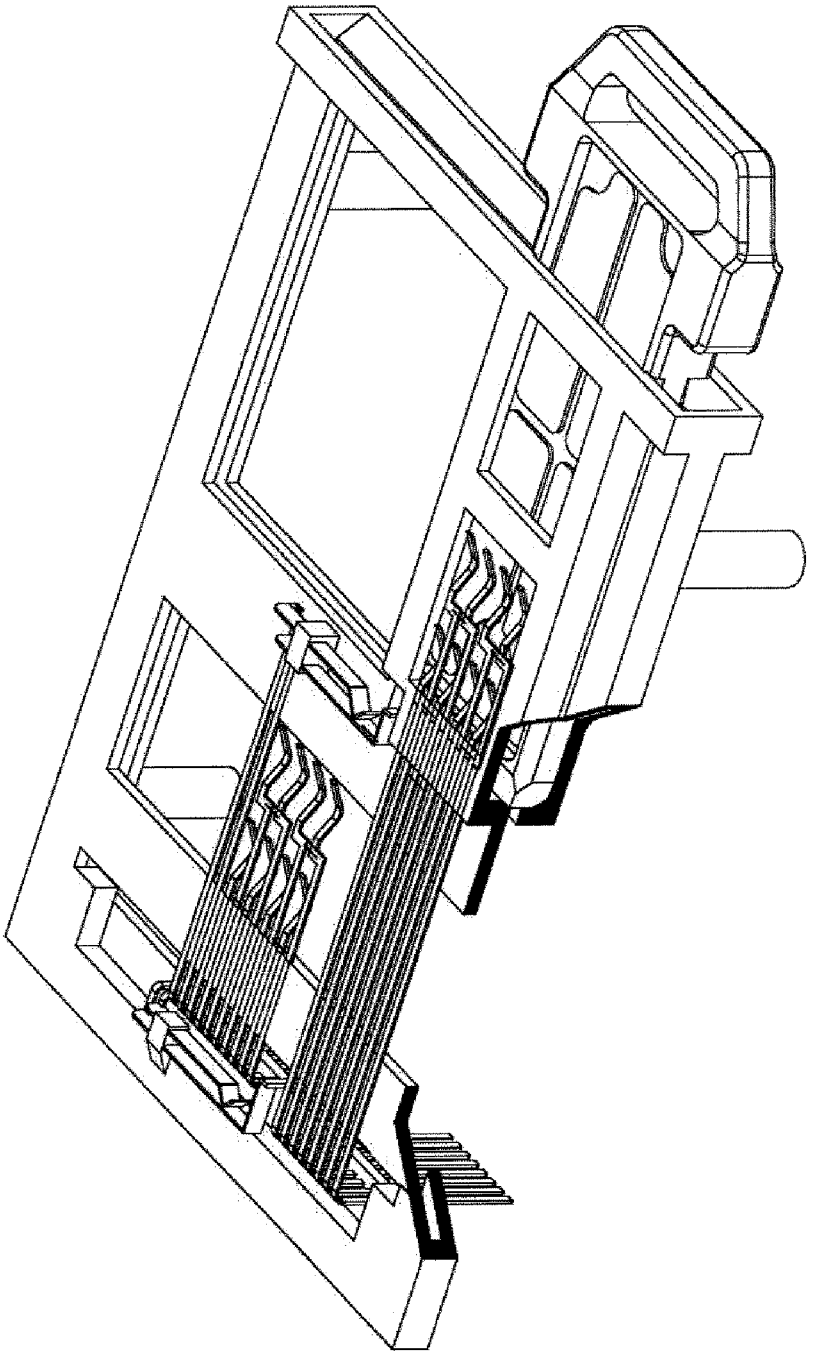


Fig. 11

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 10 6406

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H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 December 2005	Garcia Congosto, M

CATEGORY OF CITED DOCUMENTS

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