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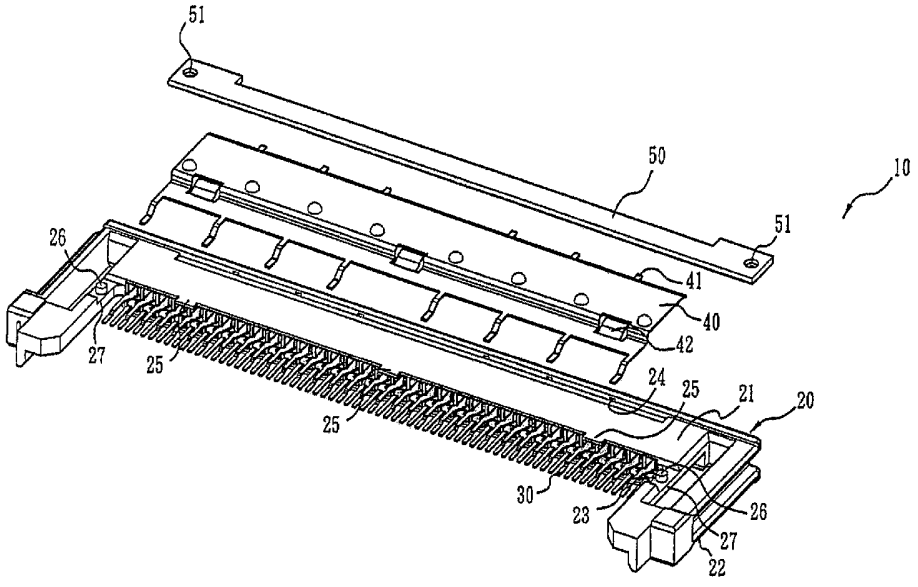
(54) Title: RECEPTACLE CONNECTOR ASSEMBLY FOR IC CARD AND IC CARD CONNECTOR



(57) Abstract: Disclosed is a receptacle connector assembly for an IC card, comprising: a connector housing (20) having a top surface (21), a bottom surface (22), and a peripheral wall (23) located between the top surface and bottom surface; a plurality of terminals (30) mounted in the connector housing and extending from the peripheral wall; a shielding member (40) removably attached to the top surface of the connector housing and having a portion extending over the terminals; and a supporting member (50) removably attached to the connector housing and covering the portion of the shielding member extending over the terminals.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Title of the Invention

Receptacle Connector Assembly for IC Card and IC Card Connector

Cross-References to Related Applications

Not Applicable

Statement Regarding Federally Sponsored Research or Development

Not Applicable

Description

Field of Invention

The invention relates to a receptacle connector assembly for an IC card, particularly to one meeting the insulation specifications prescribed in the PCMCIA protocols.

Background

In the conventional receptacle assemblies for an IC card, such as those disclosed in U.S. Patent Nos. 5,807,137 and 5,896,274, and JP11-260488, adhesive is employed to secure a shielding member for shielding noises to a header housing of the receptacle connector assembly, where the shielding member covers a portion of terminals; a metal shield of the IC card then covers a portion of the shielding member.

Though such a design helps the connector shield from noises, the shielding member may not be properly insulated from the metal shield.

In addition, the lacking of protective measure between the shielding member and the terminals results in easy penetration of dust through the gap formed between the shielding member and metal shield and into the header housing or terminals, thereby causing short circuits.

Furthermore, it is relatively inconvenient to remove the shielding member

from the header housing in case components are damaged during assembly.

Summary of Invention

It is a primary objective of this invention to provide a receptacle connector assembly that meets the specifications provided in Vol. 3, Section 4.1 of the PCMCIA protocols.

It is a further objective of this invention to provide an IC card connector having such a receptacle connector assembly.

It is another objective of this invention to provide an IC card connector allowing easy replacement of the shielding member.

It is yet another objective of this invention to provide a receptacle connector assembly capable of preventing dust from tainting the terminals.

To achieve the above objectives, this invention discloses a receptacle connector assembly, including: a connector housing having a top surface, a bottom surface, and a peripheral wall located between the top surface and bottom surface; a plurality of terminals mounted in the connector housing and extending from the peripheral wall; a shielding member removably attached to the top surface of the connector housing and having a portion extending over the terminals; and a supporting member removably attached to the connector housing and covering the portion of the shielding member extending over the terminals.

This invention further discloses an IC card connector having such a receptacle connector assembly.

Brief Description of the Drawings

These and other modifications and advantages will become even more apparent from the following detailed description of a preferred embodiment of the invention and from the drawings in which:

Fig. 1 illustrates an exploded, perspective view of a receptacle connector assembly for an IC card of this invention.

Fig. 2 is a side cross-sectional view of the receptacle connector assembly

for an IC card in Fig. 1.

Fig. 3 is a cross-sectional view illustrating an IC card connector assembled from the receptacle connector assembly as shown in Figs. 1 and 2.

Detailed Description of the Invention (Preferred Embodiments)

Fig. 1 illustrates an exploded, perspective view of a receptacle connector assembly 10 for an IC card of this invention.

The receptacle connector assembly 10 for an IC card includes: a header housing 20, a plurality of terminals 30, a shielding member 40, and a supporting member 50.

The header housing 20 includes a top surface 21, a bottom surface 22, and a peripheral wall 23 located between the top surface 21 and bottom surface 22.

The plurality of terminals 30 are mounted in the housing 20 and extend from the peripheral wall 23.

The shielding member 40 includes a plurality of positioning pins 41, and the housing 20 is formed with a plurality of openings 24 at locations corresponding to the positioning pins 41 for insertion of the positioning pins 41. As such, the shielding member 40 may be attached to the top surface 21 of the housing 20 to allow a portion A thereof extending over the terminals 30, as shown in Fig. 2.

The receptacle assembly 10 may include a locking mechanism for removably locking the shielding member 40 to the housing 20.

According to a preferred embodiment of this invention, the locking mechanism includes: a plurality of resilient tabs 42 formed on the shielding member 40; and a plurality of protrusions 25 formed on the housing 20 at locations corresponding to the resilient tabs 42. As such, the protrusions 25 may be inserted under the resilient tabs 42 so as to removably lock the shielding member 40 to the housing 20.

The shielding member 40 is preferably made of brass sheets by stamping.

The supporting member 50 is removably attached to the housing 20 and covers the portion A of the shielding member 40 extending over the terminals

30. The receptacle connector assembly 10 includes a mounting mechanism for removably mounting the supporting member 50 to the housing 20.

According to a preferred embodiment of this invention, the mounting mechanism includes: a pair of posts 26 symmetrically arranged on the top surface 21 at two opposing ends of the housing 20; and a pair of holes 51 formed on the supporting member 50 at locations corresponding to the posts 26 for insertion of the posts 26. The tops of the posts 26 may be pressed and deformed by a jig to serve as rivets for securing the supporting member 50 on the housing 20 when necessary.

According to another embodiment of this invention as shown, the mounting mechanism may include: a recess 27 formed at each of two opposing ends of the top surface 21 of the housing 20 for press-fitting with the opposing ends of the supporting member 50. The recesses 27 and posts 26-holes 51 may be adopted selectively or simultaneously as required to ensure secured attachment result.

To assemble the header housing 20 into an IC card connector 100, as shown in Fig. 3, a metal shield 60 covering an IC card substrate is mounted over an outer side of a portion of the top surface 21 of the header housing 20. The portion A of the shielding member 40 that extends over the terminals 30 is extended between a portion between the metal shield 60 and the terminals 30. The supporting member 50 then extends between the metal shield 60 and the shielding member 40.

To ensure that the assembled IC card connector 100 can meet the specifications provided in Vol. 3, Section 4.1 of the PCMCIA protocols, the supporting member 50 provided between the metal shield 60 and shielding member 40 is preferably made of an insulating material, such as plastics or Liquid Crystal Polymer (LCP) by injection molding.

Because the shielding member 40 and supporting member 50 in this invention can be mounted to the header housing 20 in a removable manner, the shielding member 40 and supporting member 50 may be easily removed and replaced with new components when such components are damaged during

assembly.

In addition, the supporting member 50 can also prevent penetration of dust into the gap formed between the shielding member 40 and metal shield 60 thereby eliminating the occurrence of short circuits.

This invention is related to a novel creation that makes a breakthrough in the art. Aforementioned explanations, however, are directed to the description of preferred embodiments according to this invention. Since this invention is not limited to the specific details described in connection with the preferred embodiments, changes and implementations to certain features of the preferred embodiments without altering the overall basic function of the invention are contemplated within the scope of the appended claims.

Listing of Nomenclatures

A	portion
10	receptacle assembly for IC card
20	header housing
21	top surface
22	bottom surface
23	peripheral wall
24	openings
25	protrusions
26	posts
27	recess
30	terminals
40	shielding member
41	positioning pins
42	resilient tabs

50 supporting member

51 holes

60 metal shield

100 IC card connector

What is Claimed is:

1. A receptacle connector assembly, comprising:

a connector housing having a top surface, a bottom surface, and a peripheral wall located between the top surface and bottom surface;

a plurality of terminals mounted in the connector housing and extending from the peripheral wall;

a shielding member removably attached to the top surface of the connector housing and having a portion extending over the terminals; and

a supporting member removably attached to the connector housing and covering the portion of the shielding member extending over the terminals.

2. The receptacle connector assembly according to Claim 1, wherein the shielding member includes a plurality of positioning pins, and the connector housing is formed with a plurality of openings at locations corresponding to the positioning pins for insertion of the positioning pins.

3. The receptacle connector assembly according to Claim 2, further comprising a locking mechanism for removably locking the shielding member to the connector housing.

4. The receptacle connector assembly according to Claim 3, wherein the locking mechanism comprises:

a plurality of resilient tabs formed on the shielding member; and

a plurality of protrusions formed on the connector housing at locations corresponding to the resilient tabs to be removably locked to the protrusions.

5. The receptacle connector assembly according to Claim 1, further comprising a mounting mechanism for removably mounting the supporting member to the connector housing.

6. The receptacle connector assembly according to Claim 5, wherein the mounting mechanism comprises:

a pair of posts symmetrically arranged on the top surface at two opposing ends of the connector housing; and

a pair of holes formed on the supporting member at locations corresponding to the posts for insertion of the posts.

7. The receptacle connector assembly according to Claim 6, wherein the posts serve as rivets to secure the supporting member on the connector housing.

8. The receptacle connector assembly according to Claim 5, wherein the mounting mechanism comprises: a recess formed at each of two opposing ends of the connector housing for press-fitting opposing ends of the supporting member.

9. The receptacle connector assembly according to Claim 6, wherein the mounting mechanism comprises: a recess formed at each of two opposing ends of the connector housing for press-fitting opposing ends of the supporting member.

10. The receptacle connector assembly according to Claim 1, wherein the supporting member is made of an insulating material.

11. The receptacle connector assembly according to Claim 10, wherein the supporting member is made of plastics.

12. An IC card connector, comprising:

a header having a top surface, a bottom surface, and a peripheral wall located between the top surface and bottom surface;

a metal shield mounted over a portion of the top surface of the header;

a plurality of terminals mounted in the header and extending from the peripheral wall;

a shielding member removably attached to the top surface of the header and having a portion extending between the shield and the terminals; and

a supporting member removably attached to the header and extending between the metal shield and the shielding member.

13. The IC card connector according to Claim 12, wherein the shielding member includes a plurality of positioning pins, and wherein the header is formed with a plurality of openings at locations corresponding to the positioning pins for insertion of the positioning pins.

14. The IC card connector according to Claim 13, further comprising a locking mechanism for removably locking the shielding member to the header.

15. The IC card connector according to Claim 14, wherein the locking mechanism comprises:

a plurality of resilient tabs formed on the shielding member; and

a plurality of protrusions formed on the header at locations corresponding to the resilient tabs to be removably locked to the protrusions.

16. The IC card connector according to Claim 11, further comprising a mounting mechanism for removably mounting the supporting member to the header.

17. The IC card connector according to Claim 16, wherein the mounting mechanism comprises:

a pair of posts symmetrically arranged on the top surface at two opposing ends of the header; and

a pair of holes formed on the supporting member at locations corresponding to the posts for insertion of the posts.

18. The IC card connector according to Claim 17, wherein the posts serve as rivets to secure the supporting member on the header.

19. The IC card connector according to Claim 16, wherein the mounting mechanism comprises: a recess formed at two opposing ends of the header for press-fitting opposing ends of the supporting member.

20. The IC card connector according to Claim 17, wherein the mounting mechanism comprises: a recess formed at two opposing ends of the header for press-fitting opposing ends of the supporting member.

21. The IC card connector according to Claim 12, wherein the supporting

member is made of any insulating materials.

22. The IC card connector according to Claim 21, wherein the supporting member is made of plastics.

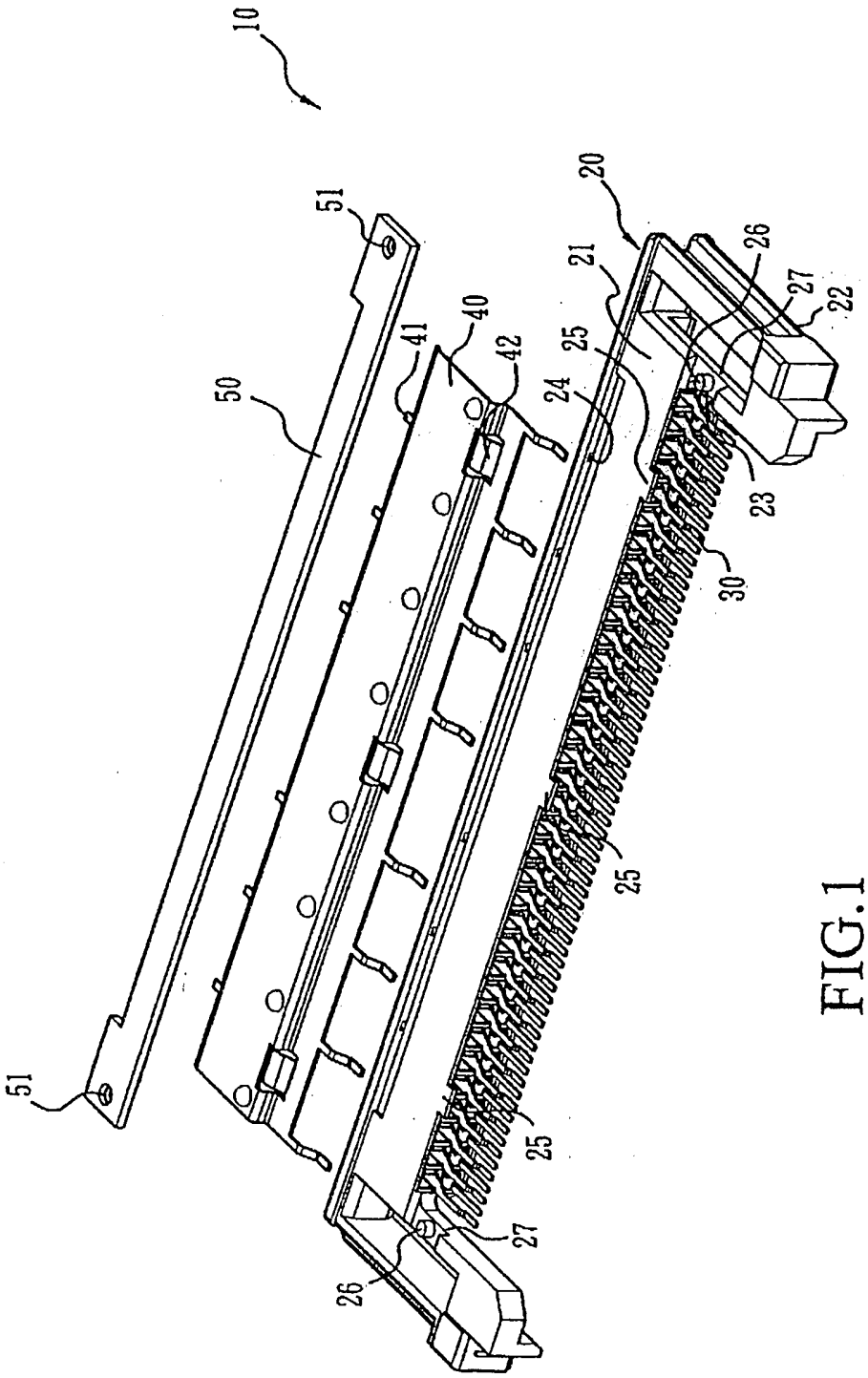

FIG.1

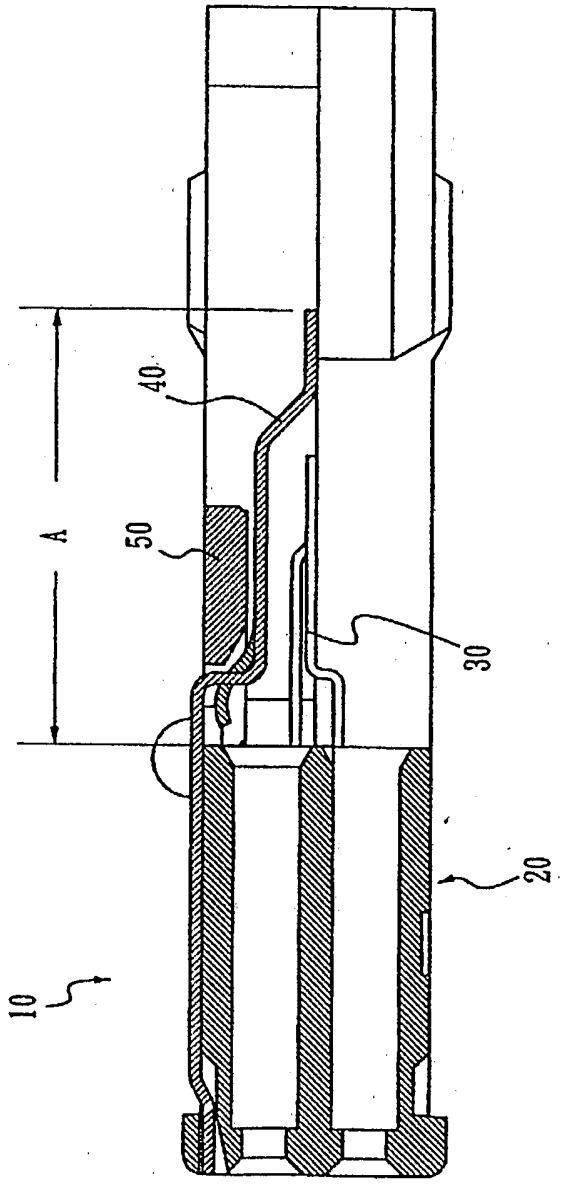

FIG.2

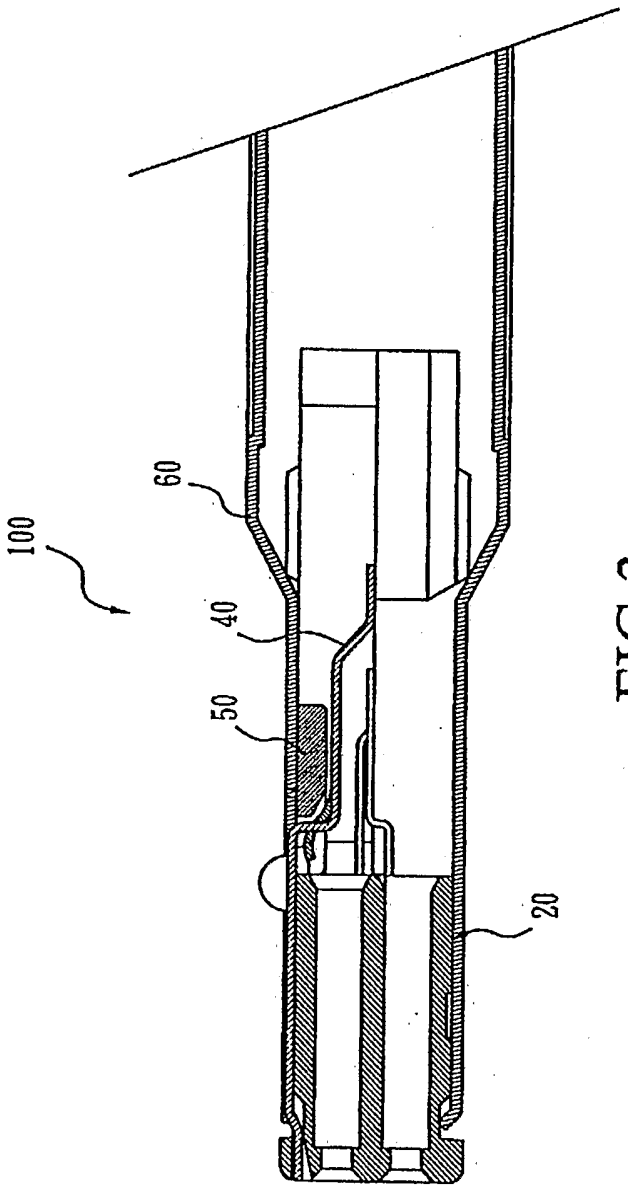

FIG.3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SG2004/000176

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: H01R 13/658

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)

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DWPI : IPC H01R 13/- and keywords (shield, screen, protect, noise, electromagnetic, pin, finger, tab, lock, latch) and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0834964 A1 (MOLEX INCORPORATED) 8 April 1998 see figures 3 and 4 in particular	1-22
A	US 5896274 A (ISHIDA) 20 April 1999 abstract and figure 14	

☐ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 July 2004	30 JUL 2004
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer **A. ALI** Telephone No : (02) 6283 2607

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/SG2004/000176

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
EP	0834964	JP	10116654	SG	55965	US	5807137
US	5896274	EP	0794698	JP	9245143		

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX