



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	10/27/2022	Chou Hsien Tsai	11390-1-REI-CON	1048
62574	7590	02/18/2025		
Jason H. Vick AMPED IP LLC 2370 E. 160th PL Thornton, CO 80602			EXAMINER DONDERO, WILLIAM E	
			ART UNIT	PAPER NUMBER
			3993	
			NOTIFICATION DATE	DELIVERY MODE
			02/18/2025	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jvick@amped-ip.com
jvos@amped-ip.com

APPLICATION NO.	ISSUE DATE	PATENT NO.
17/974,866	18-Feb-2025	RE050307

Jason H. Vick
AMPED IP LLC
2370 E. 160th PL
Thornton, CO 80602

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at <https://patentcenter.uspto.gov>

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit <https://www.uspto.gov/electronicgrants>



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	02/18/2025	RE50307	11390-1-REI-CON	1048
62574	7590	01/29/2025		
Jason H. Vick AMPED IP LLC 2370 E. 160th PL Thornton, CO 80602				

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at <https://patentcenter.uspto.gov/>. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at <https://certifiedcopycenter.uspto.gov/index.html>. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PATENT CENTER site <https://patentcenter.uspto.gov> for additional inventors):

Chou Hsien Tsai, New Taipei City, TAIWAN;

APPLICANT(s) (Please see PATENT CENTER site <https://patentcenter.uspto.gov> for additional applicants):

KIWI INTELLECTUAL ASSETS CORPORATION, NEW TAIPEI CITY, TAIWAN

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	10/27/2022	Chou Hsien Tsai	123151.0001.1_KIWI-IREIC	1048
62574	7590	11/29/2024		
Jason H. Vick WOMBLE BOND DICKINSON (US) LLP 2370 E. 160th PL Thornton, CO 80602			EXAMINER DONDERO, WILLIAM E	
			ART UNIT 3993	PAPER NUMBER
			NOTIFICATION DATE 11/29/2024	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jason.vick@wbd-us.com
joanne.vos@wbd-us.com

Corrected Notice of Allowability	Application No. 17/974,866	Applicant(s) Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993
		AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment of 5 November 2024.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 35-136. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☒ All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☒ Certified copies of the priority documents have been received in Application No. 12/759,408.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892) 2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____. 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material ____. 4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.	5. ☒ Examiner's Amendment/Comment 6. ☐ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____.
---	--

/WILLIAM E DONDERO/ Reexamination Specialist, Art Unit 3993	
--	--

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in an interview with Jason Vick on November 21, 2024.

The application has been amended as follows:

In The Specification:

On col. 6, starting at line 20 of U.S. Patent 8,198,563, please amend the specification as follows:

In a front view, the one row of connection terminals 11 have the serial numbers of 4, 3, 2, 1 from left to right (i.e., a functional reverse mirror configuration). When the connection terminals 11 of the USB 2.0 plug 10 face the second surface 502 of the tongue 50 and are normally inserted into the connection slot 45, its chamber 14 is fitted with the tongue 50, and its one row of connection terminals 11 are turned into the serial numbers of 1, 2, 3, 4 from left to right, and are electrically connected to the second contact 71 of the one row of second terminals 70 on the bottom of the tongue 50 (the serial numbers are 1, 2, 3, 4 from left to right).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM E DONDERO whose telephone number is (571)272-5590. The examiner can normally be reached Monday-Friday 6 am - 4 pm ET, Alternate Fridays.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, PATRICIA L ENGLE can be reached on 571-272-6660. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/WILLIAM E DONDERO/
Reexamination Specialist, Art Unit 3993

CONFEREES: /WILLIAM C DOERRLER/
Reexamination Specialist, Art Unit 3993

/Patricia L Engle/
SPRS, Art Unit 3993



UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #
17/974,866

RECEIPT DATE / TIME
11/25/2024 10:21:41 AM Z ET

ATTORNEY DOCKET #
123151.0001.1_KIWI-1REIC

Title of Invention

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

Application Information

APPLICATION TYPE Utility - Reissue

PATENT # -

CONFIRMATION # 1048

FILED BY Joanne Vos

PATENT CENTER # 68102978

AUTHORIZED BY Jason Vick

CUSTOMER # 62574

FILING DATE 10/27/2022

CORRESPONDENCE
ADDRESS -

FIRST NAMED
INVENTOR Chou Hsien Tsai

Payment Information

PAYMENT METHOD
DA / 090528

PAYMENT TRANSACTION ID
E2024AOA22235342

PAYMENT AUTHORIZED BY
Joanne Vos

PRE-AUTHORIZED ACCOUNT
090528

PRE-AUTHORIZED CATEGORY
37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE(\$)	QUANTITY	ITEM TOTAL(\$)
2511	REISSUE ISSUE FEE	480.00	1	480.00
TOTAL AMOUNT:				\$480.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Chou Hsien Tsai	)	Group Art Unit: 3993
Application No.: 17/974,866 (Reissue of USPN 8,198,563)	)	Examiner: WILLIAM E DONDERO
Filed: Herewith	)	Confirmation No.: 1048
Atty. File No.: 123151.0001.1_KIWI-1REIC	)	

For: SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

APPLICANT'S RESPONSE TO INTERVIEW SUMMARY

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Applicant would like to thank Examiner Dondero for the courtesies extended to Applicant's undersigned representative during the November 19, 2024 telephone interview. The substance of which is reflected in the November 25, 2024 Interview Summary.

Respectfully submitted,

WOMBLE BOND DICKINSON (US) LLP

Date: November 25, 2024

By: /Jason H. Vick/
Jason H. Vick
Reg. No. 45,285
1899 Wynkoop Street, Suite 750
Denver, CO 80202
Telephone: 720-983-1336
jason.vick@wbd-us.com

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 3 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

62574 7590 11/14/2024

Jason H. Vick
WOMBLE BOND DICKINSON (US) LLP
2370 E. 160th PL
Thornton, CO 80602

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

Joanne Vos	(Typed or printed name)
/Joanne Vos/	(Signature)
November 25, 2024	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	10/27/2022	Chou Hsien Tsai	KIWI-1-REL-CON	1048

TITLE OF INVENTION: SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0.00	\$0.00	\$480	02/14/2025

EXAMINER	ART UNIT	CLASS-SUBCLASS
DONDERO, WILLIAM E	3993	439-607170

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Jason H. Vick

Womble Bond Dickinson
(US) LLP

3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

KIWI INTELLECTUAL ASSETS CORPORATION

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

NEW TAIPEI CITY, TAIWAN

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☒ Electronic Payment via the USPTO patent electronic filing system ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 09-0528

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29☐ Applicant asserting small entity status. See 37 CFR 1.27☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Jason H Vick/Date November 25, 2024Typed or printed name Jason H VickRegistration No. 45,285



UNITED STATES
PATENT AND TRADEMARK OFFICE

Page 1 of 2
P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/974,866	11/25/2024 10:21:41 AM Z ET	123151.0001.1_KIWI-1REIC

Title of Invention

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

Application Information

APPLICATION TYPE	Utility - Reissue	PATENT #	-
CONFIRMATION #	1048	FILED BY	Joanne Vos
PATENT CENTER #	68102978	FILING DATE	10/27/2022
CUSTOMER #	62574	FIRST NAMED INVENTOR	Chou Hsien Tsai
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Jason Vick

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
ISSUE_FEE_PAYMENT_KIWI-1-REI-CON.pdf	1	Issue Fee Payment (PTO-85B)	1691 KB
Response_to_Interview_Summary_KIWI-1-REI-CON.pdf	1	Applicant summary of interview with examiner	76 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
ISSUE_FEE_PAYMENT_KIWI-1-REI-CON.pdf	635AC33BB90AD6F8FFA6A062EC6A52379A528F31EE154430852C7E7012DDF81443A2525CA5B3DA83713C59E8BEDA33C1DBA63E9193B5FBE7F80D05B75294D22C
Response_to_Interview_Summary_KIWI-1-REI-CON.pdf	A21ADE20A4A88CF99304AD8731843D1198F8FF56459C39563FE9659C2A68091DEC1EBDE18B99E4A8A3FD9FCB445D9AD8

A4E86CBD7D9321266E81307775639ECC

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	10/27/2022	Chou Hsien Tsai	KIWI-1-REI-CON	1048
62574	7590	11/25/2024		
Jason H. Vick			EXAMINER	
WOMBLE BOND DICKINSON (US) LLP			DONDERO, WILLIAM E	
2370 E. 160th PL				
Thornton, CO 80602			ART UNIT	PAPER NUMBER
			3993	
			NOTIFICATION DATE	DELIVERY MODE
			11/25/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jason.vick@wbd-us.com

joanne.vos@wbd-us.com

Corrected Notice of Allowability	Application No. 17/974,866	Applicant(s) Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993
		AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Interview Summary of 19 November 2024.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 35-136. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☒ All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☒ Certified copies of the priority documents have been received in Application No. 12/759,408.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892) 2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____ 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____ 4. ☒ Interview Summary (PTO-413), Paper No./Mail Date. <u>20141119</u> .	5. ☐ Examiner's Amendment/Comment 6. ☐ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____.
---	---

/WILLIAM E DONDERO/ Reexamination Specialist, Art Unit 3993	/WILLIAM C DOERRLER/ and /Patricia L Engle/ Reexamination Specialist and SPRS, Art Unit 3993
--	---

<i>Applicant-Initiated Interview Summary</i>	Application No. 17/974,866	Applicant(s) Tsai, Chou Hsien		
	Examiner WILLIAM E DONDERO	Art Unit 3993	AIA (First Inventor to File) Status No	Page 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
WILLIAM E DONDERO	Primary Examiner	Telephonic
JASON VICK	Attorney of Record	

Date of Interview: 19 November 2024

Issues Discussed:

Other

Applicant's representative called to ask why reference 239 on the IDS filed April 30, 2024 was struck through. Examiner explained that only the translated abstract, not the entire reference, was filed and thus it was struck through and not considered. Applicant's representative noted the entire reference and translated abstract was provided in the parent reissue application 17020359 in the IDS filed September 15, 2020. Examiner was able to find the reference in the parent reissue application. Thus, the reference has been considered, cited on the attached 892, and included in the attached Corrected Notice of Allowability.

/WILLIAM E DONDERO/ Reexamination Specialist, Art Unit 3993	
<p>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</p> <p>Please further see: MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing</p>	

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

<i>Notice of References Cited</i>	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien	
	Examiner WILLIAM E DONDERO	Art Unit 3993	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
	A					
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

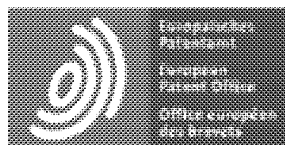
FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
	N	CN-201515048-U	2010-06-23	CN	CAI Z	
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.



Espacenet

CN201515048U Communal electric connection socket

Applicants: ZHOUXIAN CAI

Inventors: ZHOUXIAN CAI

Classifications:

IPC **H01R13/40; H01R13/66; H01R27/00;**

Priorities: CN200920158436U 2009-06-03

Application: CN201515048U 2009-06-03

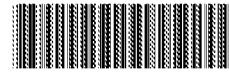
Publication: CN201515048U 2010-06-23

Published as: CN201515048U

Communal electric connection socket

Abstract

The utility model discloses a communal electric connection socket. The socket comprises a plastic seat body, a link slot, a circuit board, a row of first pins, and a row of connection terminals, wherein the link slot is provided at the front end of the plastic seat body, and can be respectively connected with two joints of different interfaces; the circuit board is arranged at the front end of the plastic seat body, adopts a tongue piece shape, and is arranged in the link slot, a row of first contact pins is arranged on one surface at the front end of the circuit board, a row of first connection points is arranged on one surface at the back end of the circuit board, each first contact pin is respectively in electric connection with each connection point through a circuit, and the row of first connection points can be in electric connection with one joint; a fixing part welded on the first connection point is arranged at one end of each first pin; and the row of connection terminals is arranged on one surface of the circuit board in radial arrangement, a stretching part, the fixing part and a pin are arranged on each connection terminal from front to back, the fixing part of each connection terminal and that of the first pin are both positioned on the same surface of the circuit board, second contact points are arranged at the stretching part and protrude out of one surface of the circuit board, and the row of second contact points can be in electric connection with the other joint.



(12) 实用新型专利

(10) 授权公告号 CN 201515048 U

(45) 授权公告日 2010.06.23

(21) 申请号 200920158436.8

(22) 申请日 2009.06.03

(73) 专利权人 蔡周贤

地址 中国台湾台北县

(72) 发明人 蔡周贤

(74) 专利代理机构 永新专利商标代理有限公司

72002

代理人 李树明

(51) Int. Cl.

H01R 12/14(2006.01)

H01R 27/00(2006.01)

H01R 13/66(2006.01)

H01R 13/40(2006.01)

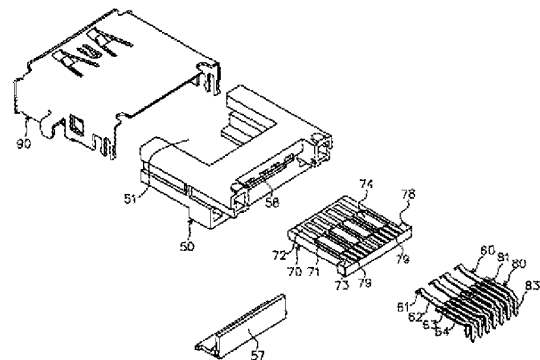
权利要求书 2 页 说明书 6 页 附图 12 页

(54) 实用新型名称

可共用的电连接插座

(57) 摘要

一种可共用的电连接插座,包括:塑胶座体;连接槽,位于该塑胶座体前端,可分别连接二不同介面的接头;电路板,设于该塑胶座体前端并呈舌片状位于该连接槽内,该电路板前段一面设有一排第一接触点,该电路板后段一面设有一排第一接点,每一第一接触点借由一电路分别与一第一接点电连接,该一排第一接触点可与一接头电连接;一排第一接脚,每一第一接脚的一端设有一固定部焊接于一该第一接点;一排连接端子,间隔排列设于该电路板一面,每一连接端子由前而后设有延伸部、固定部及接脚,每一连接端子的固定部与该第一接脚的固定部皆位于该电路板的同面,该延伸部设有第二接触点凸出该电路板一面,该一排第二接触点可与另一接头电连接。



1. 一种可共用的电连接插座,其特征在于:包括:
 - 一塑胶座体;
 - 一连接槽,位于该塑胶座体前端,其能够分别连接二不同介面的接头;
 - 一电路板,设于该塑胶座体前端并呈一舌片状位于该连接槽内,该电路板前段一面设有一排第一接触点,该电路板后段一面设有一排第一接点,每一第一接触点借由一电路分别与一第一接点电连接,该一排第一接触点能够与一接头电连接;
 - 一排第一接脚,每一第一接脚与一第一接点电连接且其一端设有一固定部;
 - 一排连接端子,间隔排列设于该电路板上侧或下侧,每一连接端子由前而后设有一延伸部、一固定部及一接脚,每一连接端子的固定部与该第一接脚的固定部皆位于该电路板的同侧,该延伸部设有一第二接触点凸出该电路板一面,该一排第二接触点能够与另一接头电连接。
2. 如权利要求1所述的可共用的电连接插座,其特征在于:该连接槽所连接的二接头为一USB接头和一e-SATA接头,该一排第一接触点为e-SATA介面,其为7个不弹动的接触点,其能够与该e-SATA接头电连接,该一排第二接触点为USB介面,其为四个可弹动的接触点,其能够与该USB接头电连接。
3. 如权利要求2所述的可共用的电连接插座,其特征在于:该第二插槽的高度较第一插槽为小且宽度较第一插槽为大,该第一插槽能够卡接一USB接头,该第二插槽能够卡接一eSATA接头。
4. 如权利要求2所述的可共用的电连接插座,其特征在于:该电路板相对于设有第一接触点的一面前段设有一排第三接触点且该面后段设有一排第三接点,每一第三接触点借由一电路分别与一第三接点电连接,该一排第三接触点与一排第二接触点位于该电路板同面,及设有一排第三接脚,其焊接于该一排第三接点。
5. 如权利要求2所述的可共用的电连接插座,其特征在于:该电路板相对于设有第一接触点的一面前段设有一排第三接触点,每一第三接触点借由一电路分别与一第一接点电连接,该一排第三接触点与一排第二接触点位于该电路板同面。
6. 如权利要求1所述的可共用的电连接插座,其特征在于:该一排第一接触点与一排第二接触点是位于该电路板同面。
7. 如权利要求1所述的可共用的电连接插座,其特征在于:该一排第一接触点与一排第二接触点是位于该电路板不同面。
8. 如权利要求1所述的可共用的电连接插座,其特征在于:该一排第一接点之间设有一排第二接点,该一连接端子的固定部焊接于该一第二接点,该一第一接脚的固定部焊接于该一第一接点。
9. 如权利要求1所述的可共用的电连接插座,其特征在于:还设有一金属外壳包覆该塑胶座体。
10. 如权利要求1所述的可共用的电连接插座,其特征在于:该一排连接端子的延伸部亦与该第一接脚的固定部位于该电路板的同面。
11. 如权利要求1所述的可共用的电连接插座,其特征在于:该电路板设有多个间隔排列且由前而后的透空槽,该连接端子的延伸部能够于该透空槽弹动。
12. 如权利要求1所述的可共用的电连接插座,其特征在于:该一排连接端子与一排第

一接脚是以一金属片同时冲压而成。

13. 如权利要求 12 所述的可共用的电连接插座,其特征在于:该一排连接端子的固定部与一排第一接脚的固定部成一排且同一高度。

14. 如权利要求 1 所述的可共用的电连接插座,其特征在于:该一排连接端子的固定部与一排第一接脚的固定部是与该塑胶座体固定。

可共用的电连接插座

【技术领域】

[0001] 本实用新型是关于一种电连接器,特别是关于一种可共用的电连接插座。

【背景技术】

[0002] 现今电脑设最普及的讯号传输规格莫过于通用串行总线 (Universal Serial Bus, 简称 USB), 以此规格制作的连接器插座及传输线可使外接于电脑的周边设备, 如滑鼠、键盘等, 即时为电脑所测得并立即使用。

[0003] 为了满足高流量资料传输的需求, 目前有另一种随插即用的传输规格, 序列先进附加技术 (External Serial ATA, 简称 eSATA), 此规格传输值较 USB 为大。

[0004] 上述 USB 和 eSATA 的介面并不相容, 两种所属的插座颇为类似然而无法共用。

[0005] 请参阅图 1, 为一种现有的讯号线连接器, 其是包括有一塑胶座体 10、四个第一端子 20、七个第二端子 25 及一金属外壳 30, 其中:

[0006] 该塑胶座体 10 是设有一 USB 接头插槽 11 及一 eSATA 接头插槽 15, 该 USB 接头插槽 11 内设有一舌片 12, 该 eSATA 接头插槽 15 内设有一舌片 16。

[0007] 该第一端子 20 固定于该塑胶座体 10, 其设有一可上下弹动的接触部 21 及一接脚 22, 该接触部 21 位于该 USB 接头插槽 11 内并凸出该舌片 12 下方, 该接脚 22 伸出塑胶座体 10 下方借以连接至一电路板 35。

[0008] 该第二端子 25 固定于该塑胶座体 10, 其设有一不可弹动的接触部 26 及一接脚 27, 该接触部 26 位于该 eSATA 接头插槽 15 内并凸出该舌片 16 上方, 该接脚 27 伸出塑胶座体 10 下方借以连接至一电路板 35。

[0009] 该金属外壳体 30 是包覆在该塑胶座体的四周面及顶面, 其一面设有开孔 31、32, 借以令 USB 接头插槽 11 及 eSATA 接头插槽 15 露出。

[0010] 请参阅图 2, 为一 USB 接头 40, 其成方形, 其设有一塑胶体 41、一外铁壳 42、及四个端子接点 43, 外铁壳 42 包覆塑胶体 41 后其内形成有空间 44, 斜线区域为示意塑胶体 41, 该四个端子接点 43 不具弹性且露出该空间 44, 请配合参阅图 1, 该 USB 接头 40 的空间 44 对应 USB 接头插槽 11 的舌片 12 插入作电连接, 此时其端子接点 43 即与第一端子 20 的接触部 21 弹性接触。

[0011] 请参阅图 3, 为一 eSATA 接头 45, 其大致成方形而两侧略为凸出, 其设有一塑胶体 46、一外铁壳 47、及七个端子接点 48, 该塑胶体 46 中间形成有空间 49, 斜线区域为示意塑胶体 46, 该七个端子接点 48 具有上下弹动的弹性且露出该空间 49, 请配合参阅图 1, 该 eSATA 接头 45 的空间 49 对应 eSATA 接头插槽 15 的舌片 16 插入作电连接, 此时其端子接点 48 即与第二端子 25 的接触部 26 弹性接触。

[0012] 上述现有的讯号线连接器上所设有 USB 接头插槽 11 仅能限定插入 USB 接头, 而 eSATA 接头插槽 15 则仅能限定插入 eSATA 接头, 即任一插槽没有共用功能, 然而由于目前电脑的功能需求日益增强, 依使用者不同需求, 电脑上可能只需连接上 4 条 USB 接头的讯号线而不需连接 eSATA 接头的讯号线, 亦有可能不需连接 USB 接头的讯号线而需连接 4 条 eSATA

接头的讯号线,如此电脑为配合使用者的不同需求,则必需分别各设置有 4 个 USB 接头插槽及 4 个 eSATA 接头插槽,如此相当占用空间且增加成本。

[0013] 为了使用上的方便性,目前已有设计 USB 接头的讯号线和 eSATA 接头的讯号线插座构造,然而由于 USB 接头的接点和 eSATA 接头的接点在端子依序排列方向的 X 座标形成部份重叠,故现有设计的共用插座有以下二种:

[0014] 1. 四个第一端子(连接 USB 接头的接点)和七个第二端子(连接 eSATA 接头的接点)分别设置于舌片的两面,然而由于舌片的厚度很薄,如此使得第一端子的弹动空间甚小。

[0015] 2. 四个第一端子(连接 USB 接头的接点)和七个第二端子(连接 eSATA 接头的接点)设置于舌片的同面,该四个第一端子必需找七个第二端子的间隙设置,故当连接 USB 接头时,USB 接头的接点与第一端子无法对正连接,如此电连接的包容量甚小。

[0016] 再者,为了缩短传输时间,目前的 USB 接头已发展至 USB3.0,USB2.0 接头和 USB3.0 接头形状相同,然而 USB3.0 接头的连接介面较 USB2.0 接头多出一排端子,故传输速度更快,如此若要整合 USB3.0 接头和 eSATA 接头共用,则该共用插座需设计有三排端子,如此更增加制造上的困难度。

【实用新型内容】

[0017] 本实用新型的主要目的在于提供一种可共用的电连接插座,其是借由一电路板取代舌片且其上配置电路接点,且所设置的一排连接端子和一排电路接点的接脚设置在该电路板的同一面,更加达到制造上的简便,降低制造成本。

[0018] 为达上述目的,本实用新型可共用的电连接插座,其包括有:一塑胶座体;一连接槽,其位于该塑胶座体前端,其可分别连接二不同介面的接头;一电路板,其设于该塑胶座体前端并呈一舌片状位于该连接槽内,该电路板前段一面设有一排第一接触点,该电路板后段一面设有一排第一接点,每一第一接触点借由一电路分别与一第一接点电连接,该一排第一接触点可与一接头电连接;一排第一接脚,每一第一接脚的一端设有一固定部焊接于一该第一接点;一排连接端子,其间隔排列设于该电路板一面,每一连接端子由前而后设有一延伸部、一固定部及一接脚,每一连接端子的固定部与该第一接脚的固定部皆位于该电路板的同面,该延伸部设有一第二接触点凸出该电路板一面,该一排第二接触点可与另一接头电连接。

[0019] 所述的可共用的电连接插座,其特征在于:该连接槽所连接的二接头为一 USB 接头和一 e-SATA 接头,该一排第一接触点为 e-SATA 介面,其为 7 个不弹动的接触点,其能够与该 e-SATA 接头电连接,该一排第二接触点为 USB 介面,其为四个可弹动的接触点,其能够与该 USB 接头电连接。

[0020] 所述的可共用的电连接插座,其特征在于:该第二插槽的高度较第一插槽为小且宽度较第一插槽为大,该第一插槽能够卡接一 USB 接头,该第二插槽能够卡接一 eSATA 接头。

[0021] 所述的可共用的电连接插座,其特征在于:该电路板相对于设有第一接触点的一面前段设有一排第三接触点且该面后段设有一排第三接点,每一第三接触点借由一电路分别与一第三接点电连接,该一排第三接触点与一排第二接触点位于该电路板同面,及设有

一排第三接脚,其焊接于该一排第三接点。

[0022] 所述的可共用的电连接插座,其特征在于:该电路板相对于设有第一接触点的一面前段设有一排第三接触点,每一第三接触点借由一电路分别与一第一接点电连接,该一排第三接触点与一排第二接触点位于该电路板同面。

[0023] 所述的可共用的电连接插座,其特征在于:该一排第一接触点与一排第二接触点是位于该电路板同面。

[0024] 所述的可共用的电连接插座,其特征在于:该一排第一接触点与一排第二接触点是位于该电路板不同面。

[0025] 所述的可共用的电连接插座,其特征在于:该一排第一接点之间设有一排第二接点,该一连接端子的固定部焊接于该一第二接点,该一第一接脚的固定部焊接于该一第一接点。

[0026] 所述的可共用的电连接插座,其特征在于:还设有一金属外壳包覆该塑胶座体。

[0027] 所述的可共用的电连接插座,其特征在于:该一排连接端子的延伸部亦与该第一接脚的固定部位于该电路板的同面。

[0028] 所述的可共用的电连接插座,其特征在于:该电路板设有多个间隔排列且由前而后的透空槽,该连接端子的延伸部能够于该透空槽弹动。

[0029] 所述的可共用的电连接插座,其特征在于:该一排连接端子与一排第一接脚是以一金属片同时冲压而成。

[0030] 所述的可共用的电连接插座,其特征在于:该一排连接端子的固定部与一排第一接脚的固定部成一排且同一高度。

[0031] 所述的可共用的电连接插座,其特征在于:该一排连接端子的固定部与一排第一接脚的固定部是与该塑胶座体固定。

[0032] 本实用新型优点在于:借由该电路板的两面分别可设置不需弹动的电路接触点,如此可取代二排连接端子,故本实用新型的实施例仅需设置一排会弹动的连接端子即可,可达到制造上的简便。该电路板取代舌片,可使塑胶座体在射出成型上更为简化。本实用新型的一排连接端子和一排电路接点的接脚设置在该电路板的同一面,如此在制造上可以一片铜材冲压,减少材料成本,冲压完成的一排连接端子和一排第一接脚皆由一料带相连,如此在电镀、组装等加工上皆较为简便而更加降低制造成本。

[0033] 本实用新型的上述及其他目的、优点和特色由以下较佳实施例的详细说明中并参考图式当可更加明白。

【附图说明】

[0034] 图1是现有的讯号线连接器的前视图。

[0035] 图2是现有USB接头前视示意图。

[0036] 图3是现有eSATA接头前视示意图。

[0037] 图4是本实用新型第一实施例的立体分解图。

[0038] 图5是本实用新型第一实施例的立体组合图。

[0039] 图6是本实用新型第一实施例的前视图。

[0040] 图7是本实用新型第二实施例的立体分解图。

- [0041] 图 8 是本实用新型第二实施例的电路板下面立体图。
- [0042] 图 9 是本实用新型第二实施例的前视图。
- [0043] 图 10 是本实用新型第二实施例的立体组合图。
- [0044] 图 11 是本实用新型第三实施例的立体分解图。
- [0045] 图 12 是本实用新型第三实施例的电路板下面立体图。
- [0046] 图 13 是本实用新型第三实施例的前视图。
- [0047] 图 14 是本实用新型第四实施例的立体分解图。
- [0048] 图 15 是本实用新型第四实施例的电路板下面立体图。
- [0049] 图 16 是本实用新型第四实施例的前视图。
- [0050] 图 17 是本实用新型第五实施例的立体分解图。
- [0051] 图 18 是本实用新型第六实施例的立体分解图。
- [0052] 图 19 是本实用新型第七实施例的侧视剖面图。
- [0053] 塑胶座体 50 连接槽 51 第一插槽 52 第二插槽 53 卡槽 54
- [0054] 后盖 57 套接穿孔 58 连接端子 60 第二接触点 61 延伸部 62
- [0055] 固定部 63 接脚 64
- [0056] 电路板 70 第一电路 71 第一接触点 72 第一接点 73 透空槽 74
- [0057] 第三接触点 76 第三接点 77 第二电路 75
- [0058] 第二接点 79 凸部 78 导电孔 710 第三接脚 85
- [0059] 第一接脚 80 固定部 81 凸部 82 接脚 83 金属外壳 90

【具体实施方式】

[0060] 请参阅图 4、图 5 及图 6，本实施例为 USB2.0 介面及 eSATA 介面的共用插座，其包括有一塑胶座体 50、一排连接端子 60、一电路板 70、一排第一接脚 80 及一金属外壳 90，其中：

[0061] 该塑胶座体 50 前端设有一连接槽 51，该连接槽 51 是包括有一第一插槽 52 及一第二插槽 53，该第二插槽 53 的高度较第一插槽 52 为小且宽度较第一插槽 52 为宽，该第一、二插槽 52、53 具有共用空间，该第一插槽 52 可插入卡合一 USB 接头，该第二插槽 53 可插入卡合一 eSATA 接头，其后端由下而上盖合一后盖 57，另外由后端至该连接槽 51 设有一套接穿孔 58。

[0062] 该电路板 70 是由后穿过该塑胶座体 50 的套接穿孔 58 并呈一舌片状位于该连接槽 51 内，该电路板 70 前段上面设有一排共计 7 个间隔排列的第一接触点 72 且同面后段设有一排 7 个第一接点 73，该一排 7 个第一接点 73 之间设有一排 4 个第二接点 79，该电路板 70 设有四个间隔排列且由前而后的透空槽 74 且上面设有 7 条第一电路 71，每一第一接触点 72 借由一第一电路 71 分别与一第一接点 73 电连接，该每一透空槽 74 对应一第二接点 79，该一排第一接触点 72 为 e-SATA 介面可与该 e-SATA 接头电连接，另外该电路板 70 后端两侧设有凸部 78 借以与塑胶座体 50 卡定。

[0063] 该一排连接端子 60 呈间隔排列固定于该塑胶座体 50，其由前而后设有一延伸部 62、一固定部 63 及一接脚 64，该延伸部接近末端弯曲凸出一第二接触点 61，该固定部 63 与该电路板上面的第二接点 79 焊接固定，该第二接触点 61 凸出该电路板 70 上面且延伸部 62

可于该透空槽 74 弹动,该一排第二接触点为 USB 介面,其为四个可弹动的接触点,其可与该 USB 接头电连接。

[0064] 该一排第一接脚 80 共有 7 支,其一端设有一呈水平的固定部 81 焊接固定于该电路板 70 上面的第一接点 73,其另一端呈一纵向的接脚 83 伸出该塑胶座体外。

[0065] 该金属外壳 90 是用以将该塑胶座体 50 包覆,其前面设有一开口借以令该塑胶座体 50 的连接槽 51 露出。

[0066] 本实施例的一排连接端子 70 和一排第一接脚 80 焊接在该电路板的同一面,该一排连接端子的固定部与一排第一接脚的固定部成一排且同一高度,如此在制造上可以一片铜材冲压,减少材料成本,冲压完成的一排连接端子和一排第一接脚皆由一料带相连,如此在电镀、组装等加工上皆较为简便而更加降低制造成本。

[0067] 请参阅图 7、图 8、图 9 及图 10,是本实用新型第二实施例,本实施例亦为一 USB2.0 介面及 eSATA 介面的共用插座,其大致与第一实施例相同,其差异在于本实施例的一排共计 7 个第一接触点 72 是间隔排列设于该电路板 70 前段下面,该每一第一接触点 72 借由一导电孔 710 贯通至电路板 70 前段上面与一第一电路 71 电连接。

[0068] 请参阅图 11、图 12 及图 13,是本实用新型第三实施例,本实施例为一 USB3.0 介面及 eSATA 介面的共用插座,其大致与第二实施例相同,其差异在于本实施例的电路板 70 前段上面更设有一排共计 5 个间隔排列的第三接触点 76,该每一第三接触点 76 分别与一第一电路 71 电连接,该一排第三接触点 76+一排第二接触点 61 即形成 USB3.0 介面而可与一 USB3.0 接头电连接,该 5 个第三接触点 76 与 7 个第一接触点 72 皆借由一第一电路分别电连接至一第一接点 73,故两者是为共用接脚 80。

[0069] 请参阅图 14、图 15 及图 16,是本实用新型第四实施例,本实施例为一 USB3.0 介面及 eSATA 介面的共用插座,其大致与第一实施例相同,其差异在于本实施例的电路板 70 前段下面更设有一排共计 5 个间隔排列的第三接触点 76 且同面后段设有一排 5 个第三接点 77,该每一第三接触点 76 借由一第二电路 75 分别与一第三接点 77 电连接,及另外设有一排第三接脚 85 共计 5 支,该第三接脚 85 焊接于该第三接点 77,该一排第一接脚 80 和一排连接端子 60 的固定部 63 同样亦焊接于电路板 70 上面的第一、二接点 73、79,然而该一排连接端子 60 的延伸部 62 由该透空槽 74 向下延伸使该第二接触点 61 凸出该电路板 70 下面,该一排第三接触点 76+一排第二接触点 61 即形成 USB3.0 介面可与一 USB3.0 接头电 76。

[0070] 请参阅图 17,是本实用新型第五实施例,本实施例亦为一 USB3.0 介面及 eSATA 介面的共用插座,其大致与第四实施例相同,其差异在于本实施例的该一排连接端子 60 的延伸部 62 和固定部 63 皆平贴于电路板 70 上面,其接触部 61 是由延伸部 62 刺破并向下凸出并由该透空槽 74 凸出该电路板 70 下面。

[0071] 请参阅图 18,是本实用新型第六实施例,本实施例为一 USB2.0 介面及 eSATA 介面的共用插座,其大致与第一实施例相同,其差异在于本实施例的一排第一接脚 80 的一端接脚 83 及一排连接端子 60 的接脚 64 皆呈水平并成一排,该一排第一接脚 80 的固定部 81 和一排连接端子 60 的固定部 63 成一排且同一高度且与料带 88 相连,即该一排连接端子 70 和一排第一接脚 80 在制造上是可由一片铜材冲压,减少材料成本,冲压完成的一排连接端子 60 和一排第一接脚 80 皆由该料带 88 相连。

[0072] 请参阅图 19,是本实用新型第七实施例,本实施例为一 USB2.0 介面及 eSATA 介面

的共用插座,其大致与第一实施例相同,其差异在于本实施例的该一排第一接脚 80 的固定部 81 和一排连接端子 60 的固定部 63 成一排组装固定于该塑胶座体 50 的一排卡槽 54,皆位于电路板上侧,该第一接脚 80 设有一凸部 82 弹性抵于该第一接点 73 形成电连接,该第一接点 73 同样借由第一电路与第一接触点 72 电连接。

[0073] 由以上的实施例说明本实用新型可归纳以下优点:

[0074] 1. 借由该电路板 70 的两面分别可设置不需弹动的电路接触点,如此可取代二排连接端子,故本实用新型的实施例仅需设置一排会弹动的连接端子即可,可达到制造上的简便。

[0075] 2. 该电路板 70 取代舌片,可使塑胶座体 50 在射出成型上更为简化。

[0076] 3. 本实用新型的一排连接端子和一排电路接点的接脚设置在该电路板的同一面,如此在制造上可以一片铜材冲压,减少材料成本,冲压完成的一排连接端子和一排第一接脚皆由一料带相连,如此在电镀、组装等加工上皆较为简便而更加降低制造成本。

[0077] 在较佳实施例的详细说明中所提出的具体的实施例仅为了易于说明本实用新型的技术内容,而并非将本实用新型狭义地限制于该实施例,在不超出本实用新型的精神及申请专利范围的情况,可作种种变化实施。

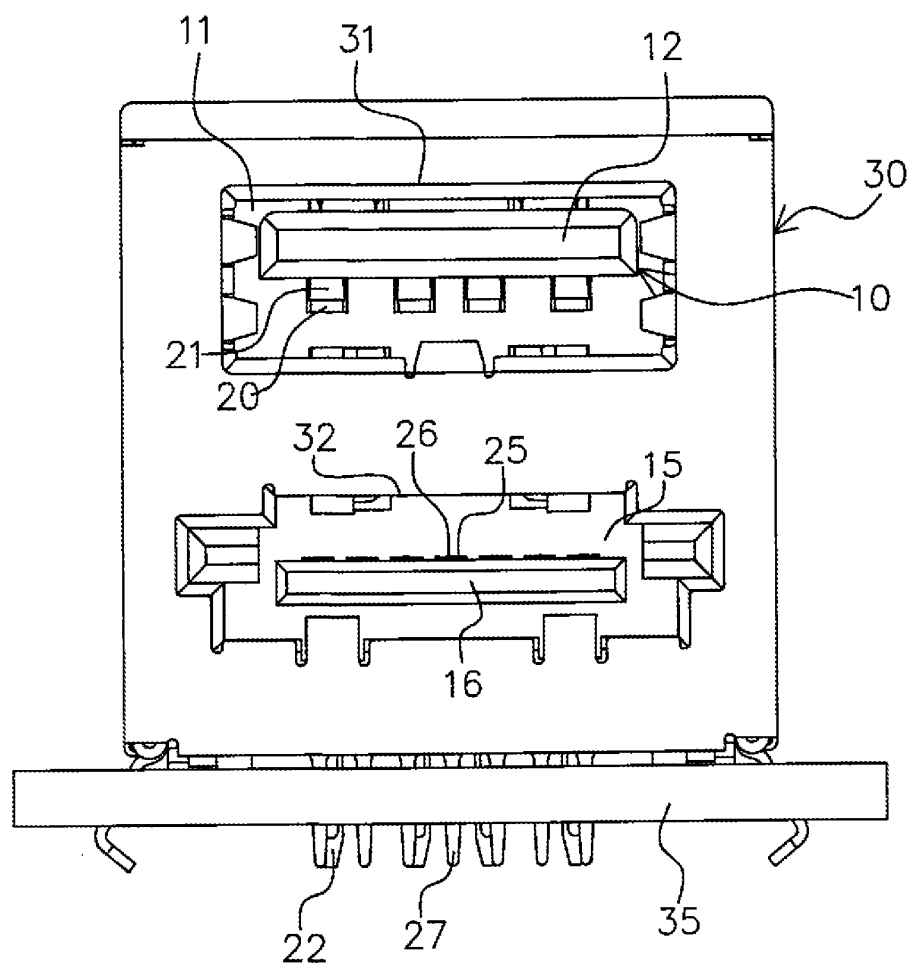


图 1

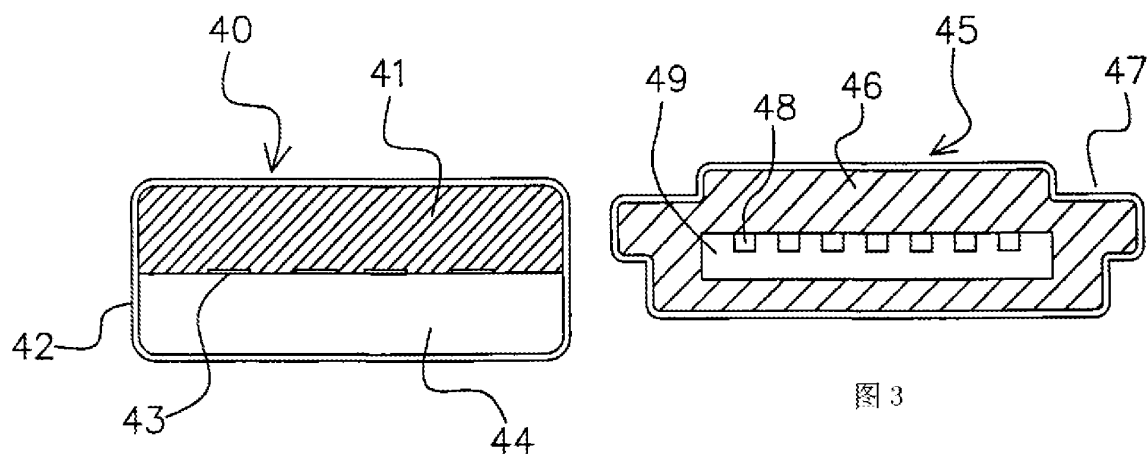


图 3

图 2

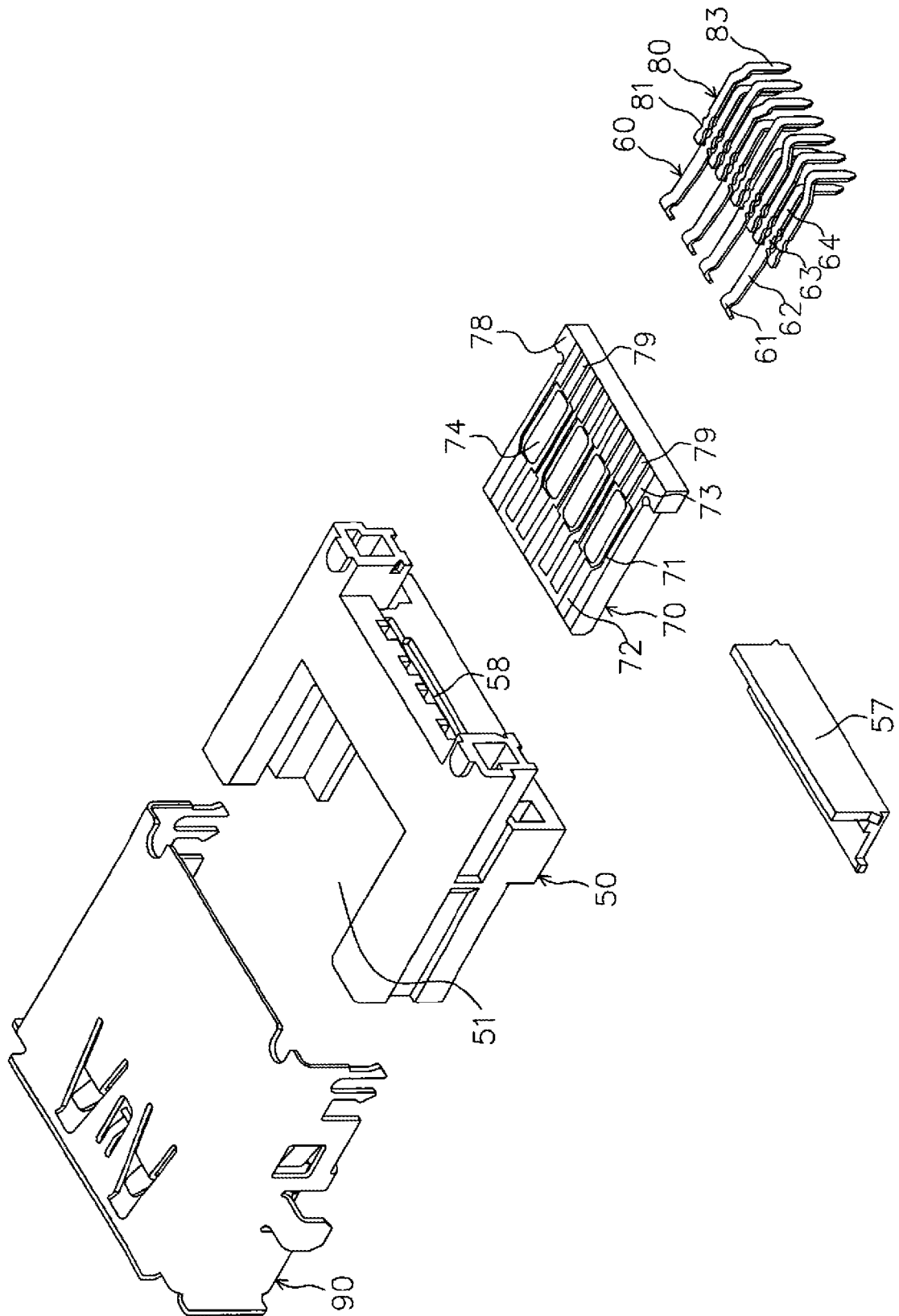


图 4

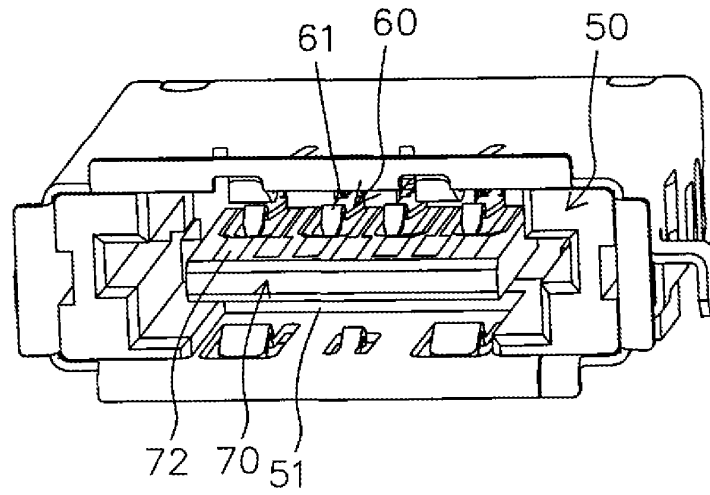


图 5

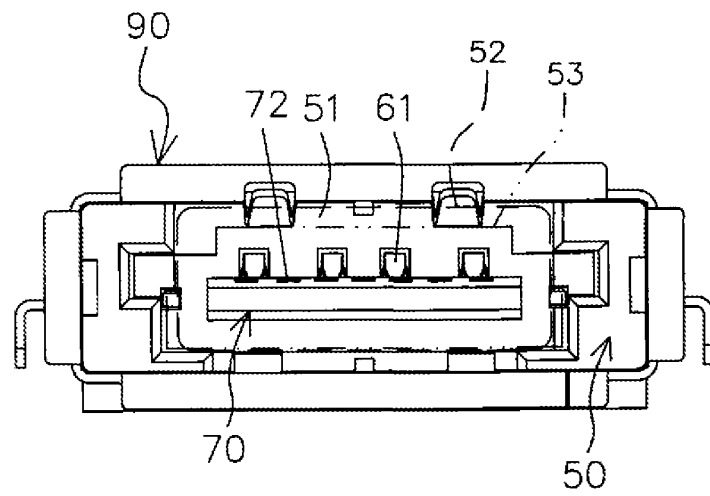
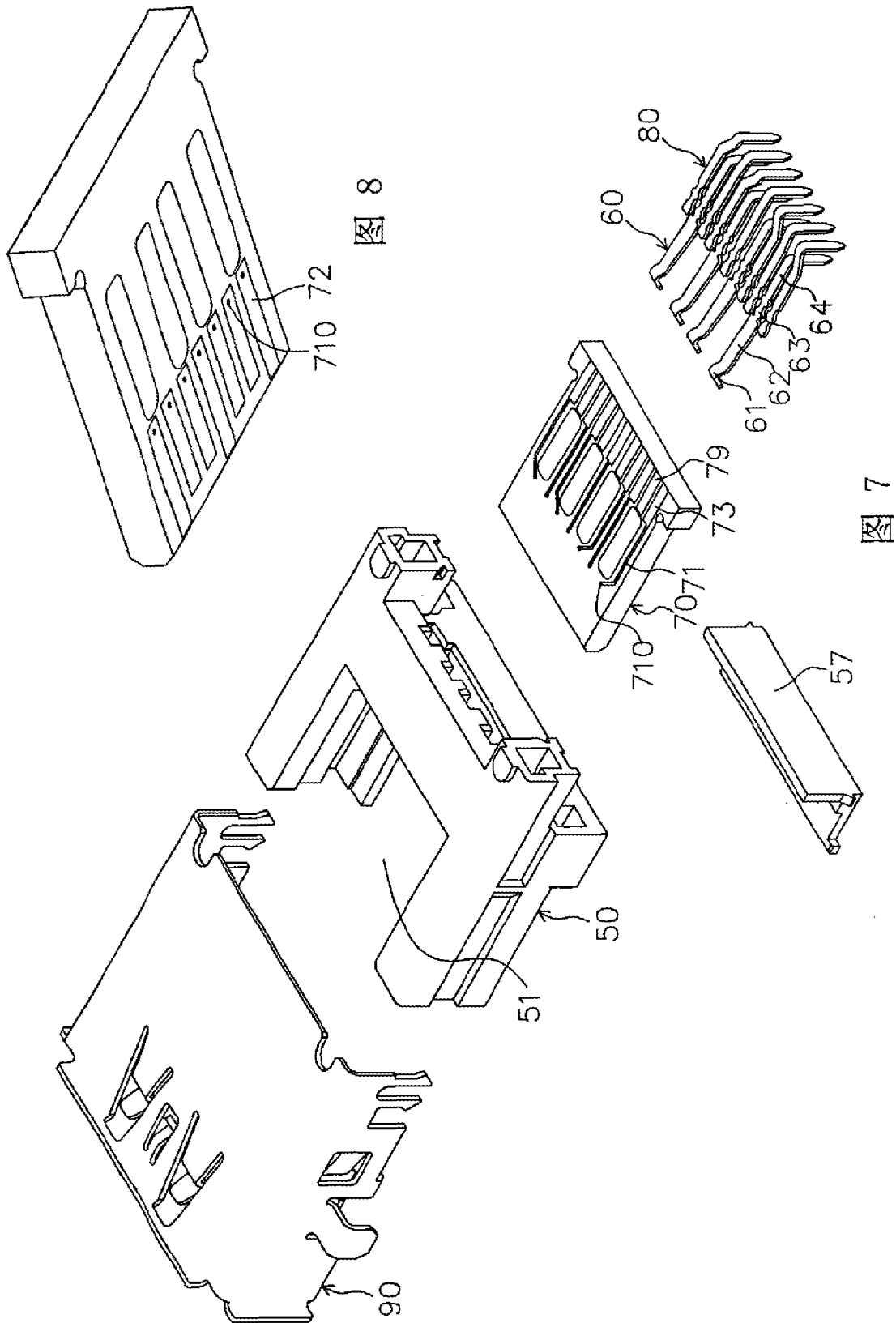


图 6



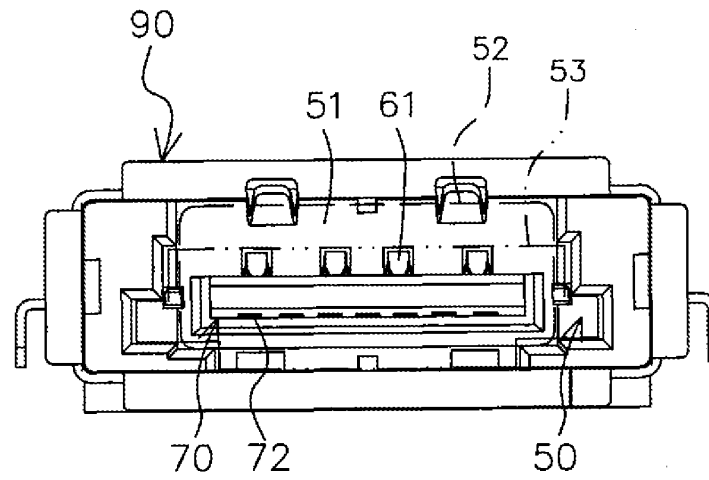


图 9

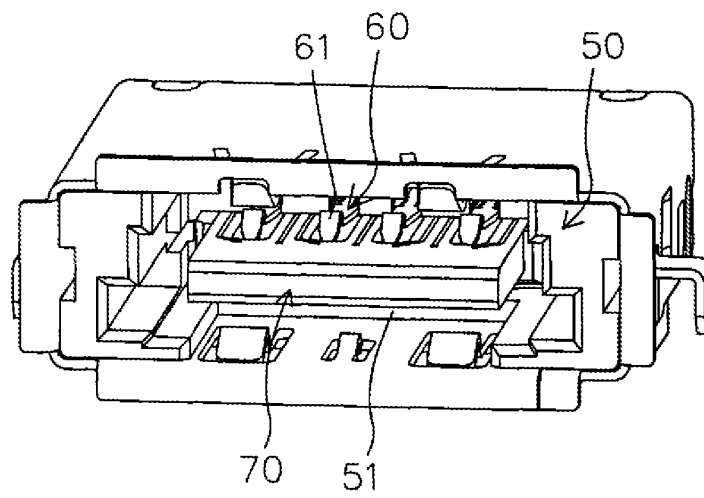


图 10

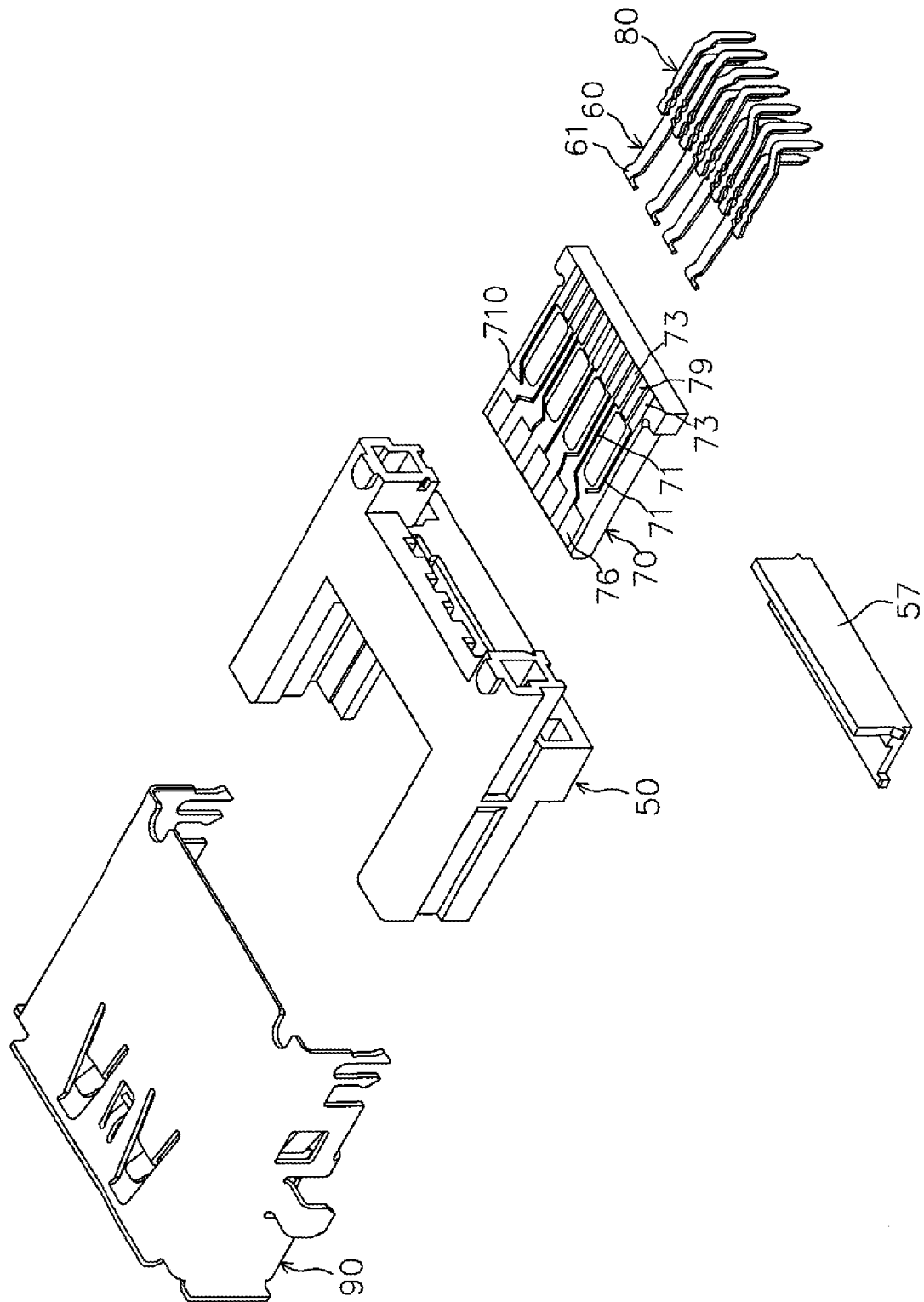


图 11

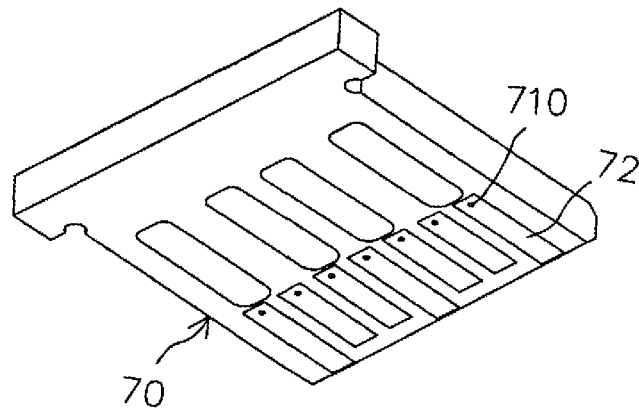


图 12

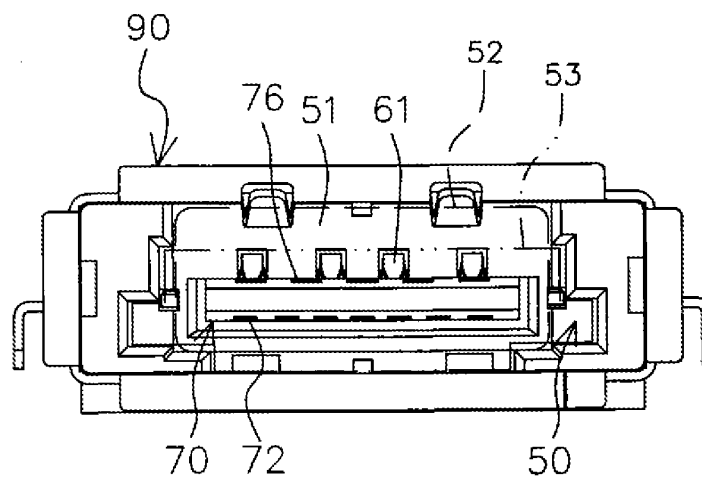


图 13

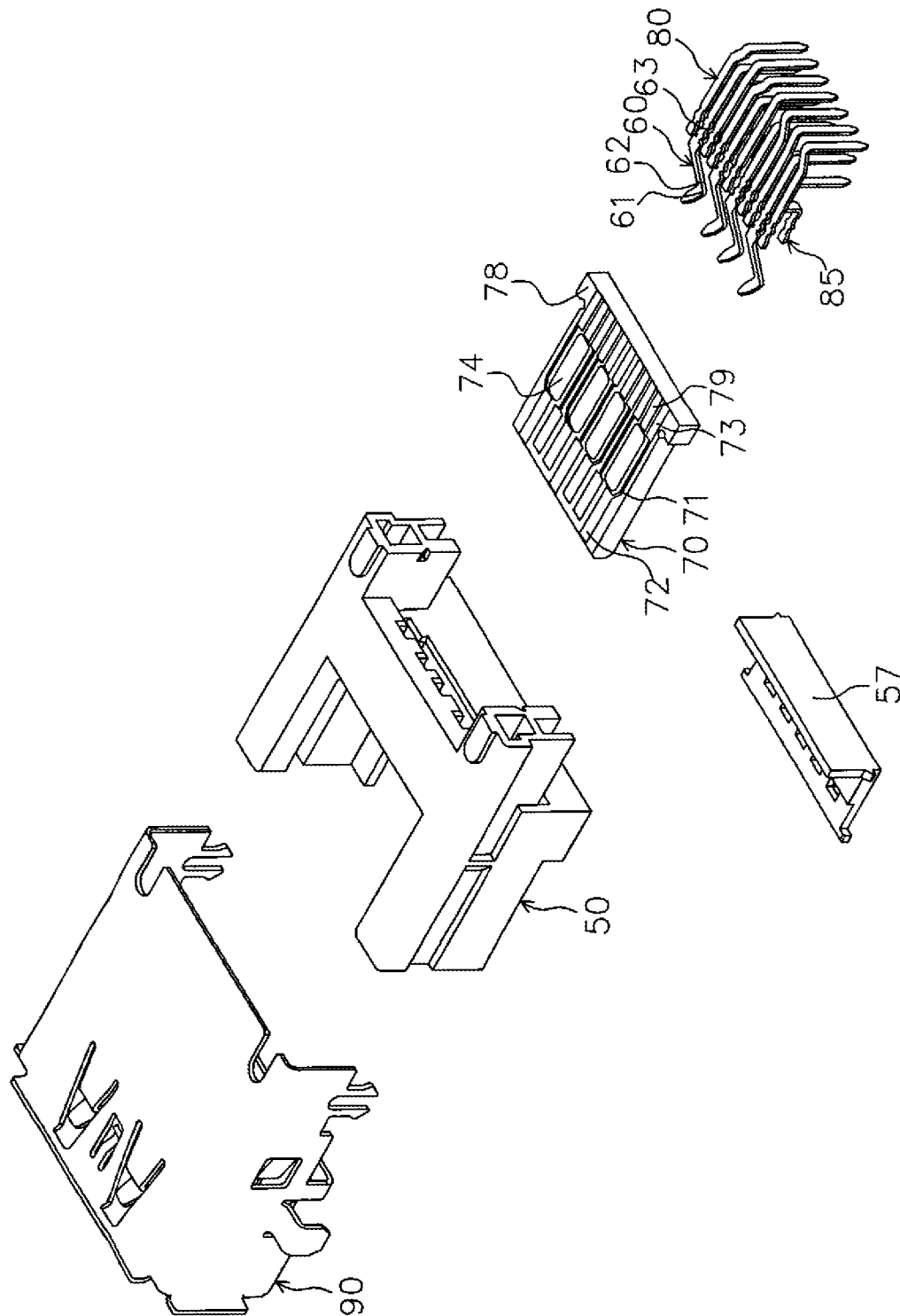


图 14

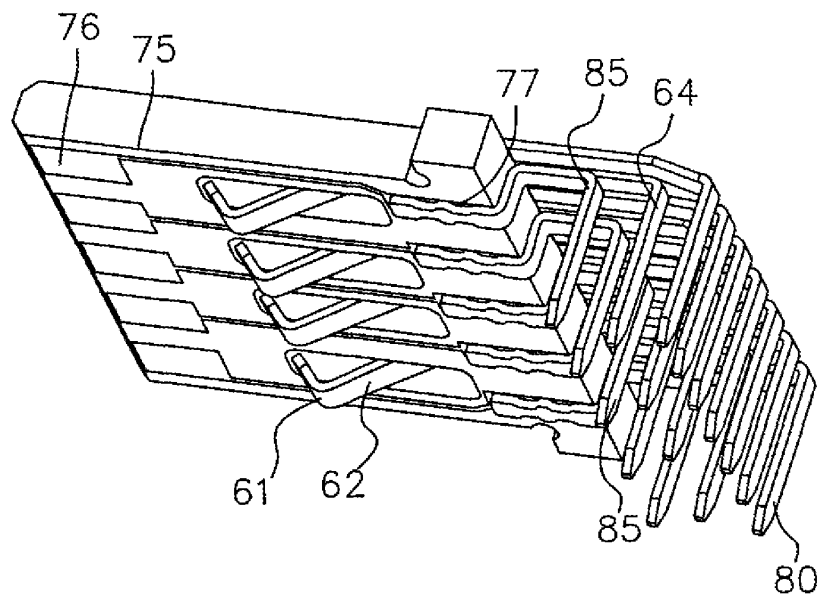


图 15

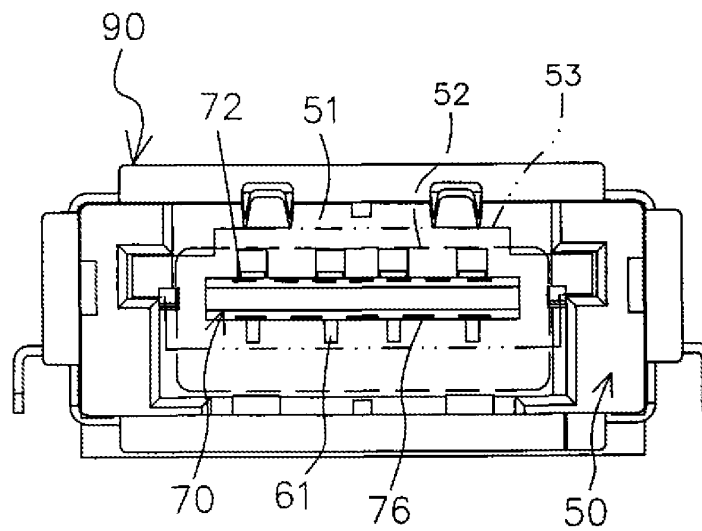


图 16

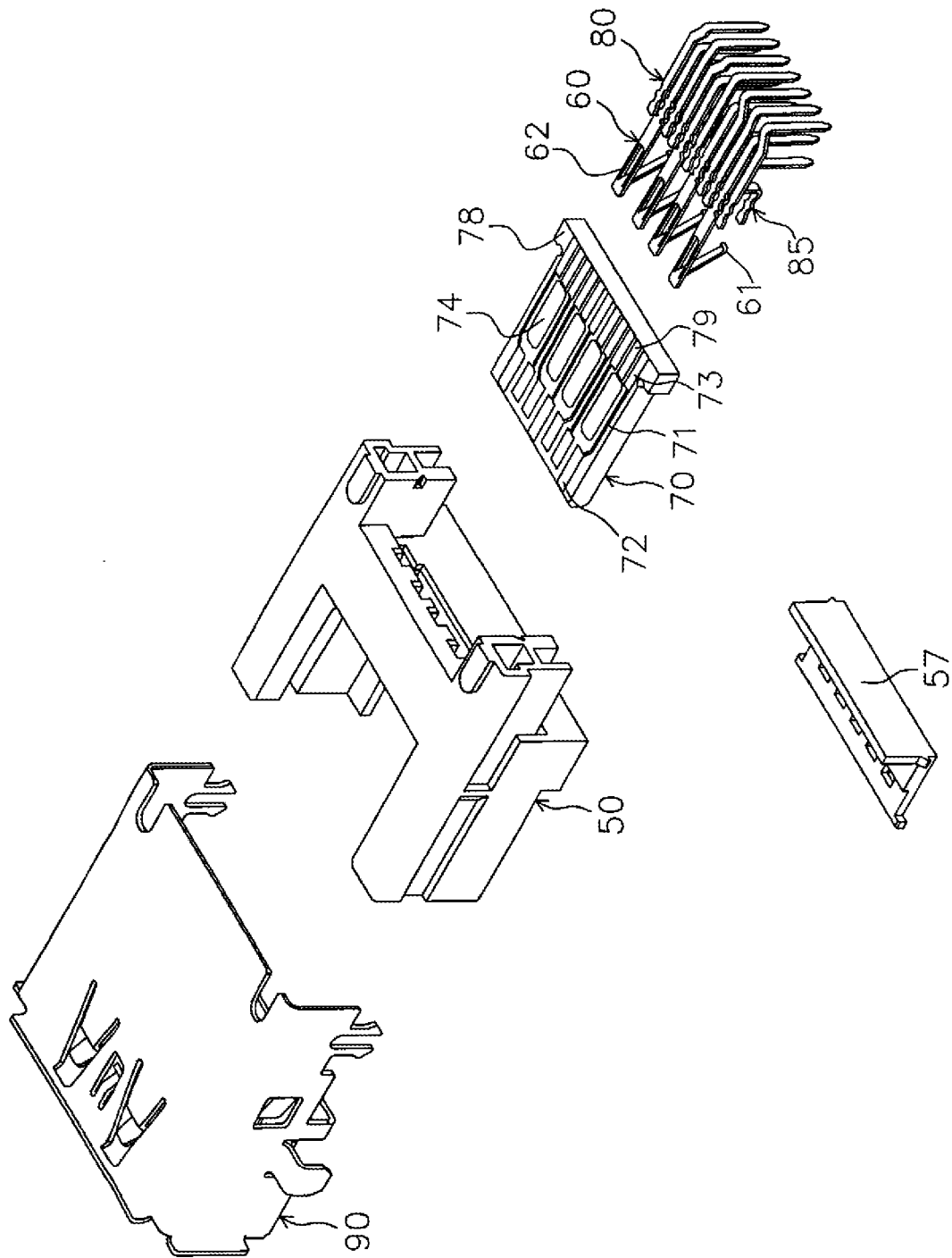


图 17

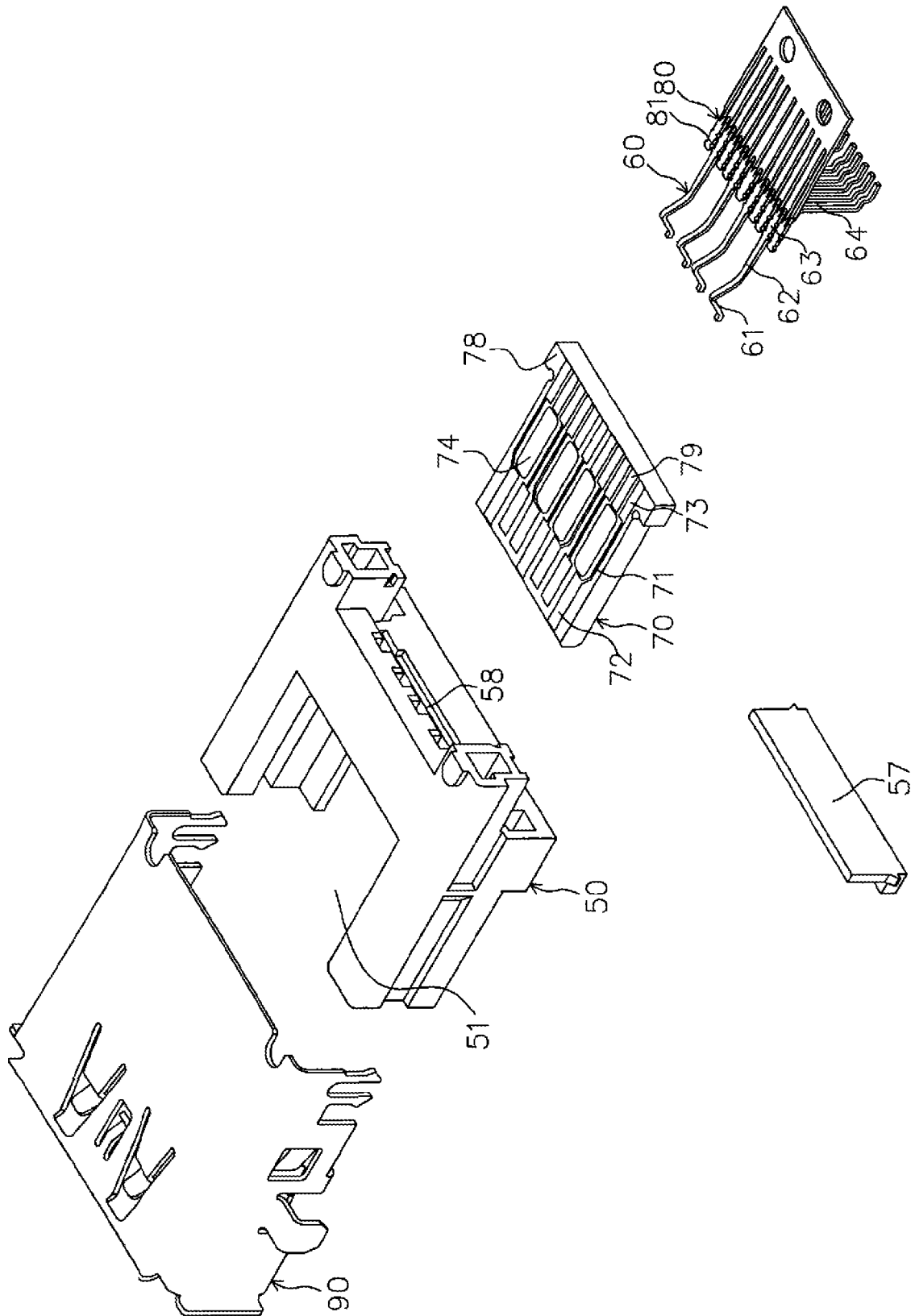


图 18

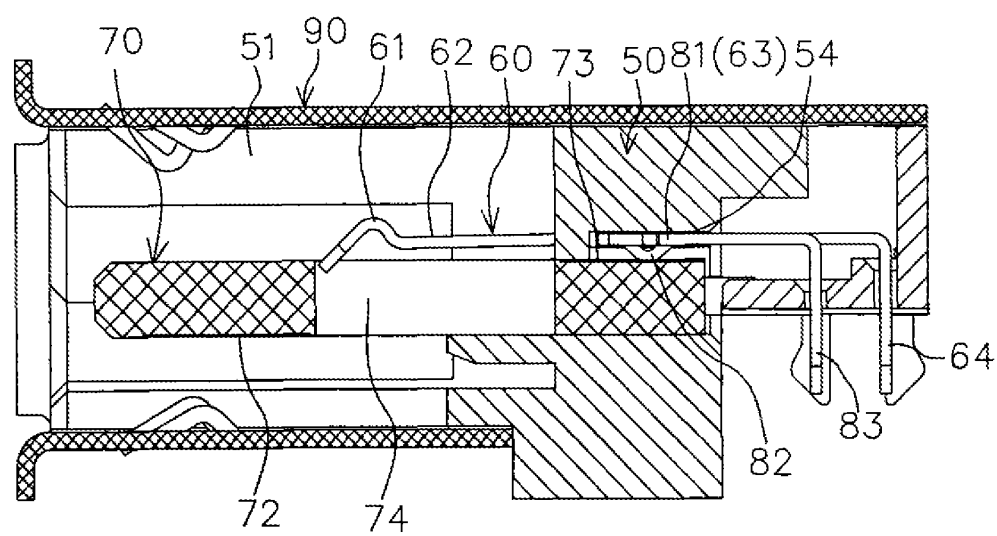


图 19



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

62574 7590 11/14/2024
Jason H. Vick
WOMBLE BOND DICKINSON (US) LLP
2370 E. 160th PL
Thornton, CO 80602

EXAMINER

DONDERO, WILLIAM E

ART UNIT

PAPER NUMBER

3993

DATE MAILED: 11/14/2024

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	10/27/2022	Chou Hsien Tsai	KIWI-1-REI-CON	1048

TITLE OF INVENTION: SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0.00	\$0.00	\$480	02/14/2025

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

62574 7590 11/14/2024

Jason H. Vick
WOMBLE BOND DICKINSON (US) LLP
2370 E. 160th PL
Thornton, CO 80602

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	10/27/2022	Chou Hsien Tsai	KIWI-1-REI-CON	1048

TITLE OF INVENTION: SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0.00	\$0.00	\$480	02/14/2025

EXAMINER	ART UNIT	CLASS-SUBCLASS
DONDERO, WILLIAM E	3993	439-607170

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

1 _____

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via the USPTO patent electronic filing system ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	10/27/2022	Chou Hsien Tsai	KIWI-1-REI-CON	1048
62574	7590	11/14/2024	EXAMINER	
Jason H. Vick WOMBLE BOND DICKINSON (US) LLP 2370 E. 160th PL Thornton, CO 80602			DONDERO, WILLIAM E	
			ART UNIT	PAPER NUMBER
			3993	

DATE MAILED: 11/14/2024

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013).

<https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to:

- 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;
- 2) a federal, state, local, or international agency, in response to its request;
- 3) a contractor of the USPTO having need for the information in order to perform a contract;
- 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;
- 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;
- 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;
- 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;
- 8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));
- 9) the Office of Personnel Management (OPM) for personnel research purposes; and
- 10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Notice of Allowability	Application No. 17/974,866	Applicant(s) Tsai, Chou Hsien	
	Examiner WILLIAM E DONDERO	Art Unit 3993	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 5 November 2024.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 35-136. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov**.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☒ All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☒ Certified copies of the priority documents have been received in Application No. 12/759,408.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☐ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____.	6. ☐ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material ____.	7. ☐ Other ____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. ____.	

/WILLIAM E DONDERO/ Reexamination Specialist, Art Unit 3993	/WILLIAM C DOERRLER/ and /Patricia L Engle/ Reexamination Specialist and SPRS, Art Unit 3993
--	---

<i>Index of Claims</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☒ Claims renumbered in the same order as presented by applicant					☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE								
Final	Original	07/08/2024	10/28/2024	11/07/2024						
	1	-	-	-						
	2	-	-	-						
	3	-	-	-						
	4	-	-	-						
	5	-	-	-						
	6	-	-	-						
	7	-	-	-						
	8	-	-	-						
	9	-	-	-						
	10	-	-	-						
	11	-	-	-						
	12	-	-	-						
	13	-	-	-						
	14	-	-	-						
	15	-	-	-						
	16	-	-	-						
	17	-	-	-						
	18	-	-	-						
	19	-	-	-						
	20	-	-	-						
	21	-	-	-						
	22	-	-	-						
	23	-	-	-						
	24	-	-	-						
	25	-	-	-						
	26	-	-	-						
	27	-	-	-						
	28	-	-	-						
	29	-	-	-						
	30	-	-	-						
	31	-	-	-						
	32	-	-	-						
	33	-	-	-						
	34	-	-	-						
	35	✓	✓	=						
	36	✓	✓	=						
	37	✓	✓	=						
	38	✓	✓	=						
	39	✓	✓	=						
	40	✓	✓	=						
	41	✓	✓	=						
	42	✓	✓	=						

<i>Index of Claims</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

CLAIM		DATE							
Final	Original	07/08/2024	10/28/2024	11/07/2024					
	43	✓	✓	=					
	44	✓	✓	=					
	45	✓	✓	=					
	46	✓	✓	=					
	47	✓	✓	=					
	48	✓	✓	=					
	49	✓	✓	=					
	50	✓	✓	=					
	51	✓	✓	=					
	52	✓	✓	=					
	53	✓	✓	=					
	54	✓	✓	=					
	55	✓	✓	=					
	56	✓	✓	=					
	57	✓	✓	=					
	58	✓	✓	=					
	59	✓	✓	=					
	60	✓	✓	=					
	61	✓	✓	=					
	62	✓	✓	=					
	63	✓	✓	=					
	64	✓	✓	=					
	65	✓	✓	=					
	66	✓	✓	=					
	67	✓	✓	=					
	68	✓	✓	=					
	69	✓	✓	=					
	70	✓	✓	=					
	71	✓	✓	=					
	72	✓	✓	=					
	73	✓	✓	=					
	74	✓	✓	=					
	75	✓	✓	=					
	76	✓	✓	=					
	77	✓	✓	=					
	78	✓	✓	=					
	79	✓	✓	=					
	80	✓	✓	=					
	81	✓	✓	=					
	82	✓	✓	=					
	83	✓	✓	=					
	84	✓	✓	=					
	85	✓	✓	=					
	86	✓	✓	=					
	87	✓	✓	=					
	88	✓	✓	=					
	89	✓	✓	=					
	90	✓	✓	=					
	91	✓	✓	=					
	92	✓	✓	=					
	93	✓	✓	=					
	94	✓	✓	=					

<i>Index of Claims</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

CLAIM		DATE							
Final	Original	07/08/2024	10/28/2024	11/07/2024					
	95	✓	✓	=					
	96	✓	✓	=					
	97	✓	✓	=					
	98	✓	✓	=					
	99	✓	✓	=					
	100	✓	✓	=					
	101	✓	✓	=					
	102	✓	✓	=					
	103	✓	✓	=					
	104	✓	✓	=					
	105	✓	✓	=					
	106	✓	✓	=					
	107	✓	✓	=					
	108	✓	✓	=					
	109	✓	✓	=					
	110	✓	✓	=					
	111	✓	✓	=					
	112	✓	✓	=					
	113	✓	✓	=					
	114	✓	✓	=					
	115	✓	✓	=					
	116	✓	✓	=					
	117	✓	✓	=					
	118	✓	✓	=					
	119	✓	✓	=					
	120	✓	✓	=					
	121	✓	✓	=					
	122	✓	✓	=					
	123	✓	✓	=					
	124	✓	✓	=					
	125	✓	✓	=					
	126	✓	✓	=					
	127	✓	✓	=					
	128	✓	✓	=					
	129	✓	✓	=					
	130	✓	✓	=					
	131	✓	✓	=					
	132	✓	✓	=					
	133	✓	✓	=					
	134	✓	✓	=					
	135	✓	✓	=					
	136	✓	✓	=					

Issue Classification 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

CPC						
Symbol					Type	Version
H01R	/	27	/	00	F	2013-01-01
H01R	/	24	/	62	I	2013-01-01

CPC Combination Sets						
Symbol			Type	Set	Ranking	Version
	/	/				

Use images from artifact folder? ☒ Yes ☐ No			
NONE		Total Claims Allowed:	
(Assistant Examiner)		102	
(Date)			
/WILLIAM E DONDERO/		07 November 2024	
Reexamination Specialist, Art Unit 3993		O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)		35	19
(Date)			

Issue Classification 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

INTERNATIONAL CLASSIFICATION			
CLAIMED			
H01R27/00	/	27	/ 00
H01R24/62	/	24	/ 62

NON-CLAIMED			
/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

Use images from artifact folder? ☒ Yes ☐ No			
NONE		Total Claims Allowed:	
(Assistant Examiner)		102	
/WILLIAM E DONDERO/		07 November 2024	
Reexamination Specialist, Art Unit 3993		O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)		35	19

Issue Classification 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original

Use images from artifact folder? ☒ Yes ☐ No						
NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 102				
/WILLIAM E DONDERO/ Reexamination Specialist, Art Unit 3993 (Primary Examiner) _____ (Date) 07 November 2024		<table><tr><td>O.G. Print Claim(s)</td><td>O.G. Print Figure</td></tr><tr><td>35</td><td>19</td></tr></table>	O.G. Print Claim(s)	O.G. Print Figure	35	19
O.G. Print Claim(s)	O.G. Print Figure					
35	19					

<i>Search Notes</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

CPC - Searched*		
Symbol	Date	Examiner
H01R 29/00	07/01/2024	/WED/
H01R 27/00	07/01/2024	/WED/
H01R 12/58,716	07/01/2024	/WED/
H01R 13/64,642,658	07/01/2024	/WED/
H05K 5/0278	07/01/2024	/WED/
G06K 19/07732	07/01/2024	/WED/

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

--	--

<i>Search Notes</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

Search Notes		
Search Notes	Date	Examiner
Text Search - see attached printout	07/01/2024	/WED/
Applicant/Assignee Search	07/01/2024	/WED/
Inventor Name Search	07/01/2024	/WED/
PDP (Patent Data Portal) Continuity Search	07/01/2024	/WED/
Reviewed Underlying patent file wrapper for US 8,198,563 (12/759,408)	07/01/2024	/WED/
Review Parent Reissue Application/Patent RE49,287 (17/020,359)	07/01/2024	/WED/
PTACTS for AIA Proceedings: None	07/01/2024	/WED/
All Above Updated	10/23/2024	/WED/
All Above Updated	11/07/2024	/WED/

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
All Above		11/07/2024	/WED/

--	--

United States Patent And Trademark Office <u>Reissue Terminal Disclaimer Review Form</u>	Application No. 17/974,866 <hr/> Examiner WILLIAM E DONDERO	Art Unit 3993 <hr/> AIA Status No
Original Patent Number of Patent to be Reissued is: <u>8,198,563</u>	The Maintenance fee status is: ☒ up to date ☐ not up to date (Consult with SPRS)	
<p>Is there a terminal disclaimer filed and <u>accepted</u> during the prosecution of (i) the current reissue application, (ii) the underlying patent, and/or (iii) reexamination proceeding(s) of the underlying patent?</p> <p> ☐ NO ☒ YES (Complete the rest of the form) </p> <p>The reissue patent is subject to Terminal Disclaimer(s) that was/were:</p> <p>☒ filed and accepted (DISQ or DISQ.E.FILE) during the prosecution of the current reissue application. (Enter terminal disclaimer(s) filing date(s) below).</p> <p style="text-align: center;"> 1. <u>21 October 2024</u> 2. _____ 3. _____ </p> <p>The underlying patent of the current reissue application is subject to Terminal Disclaimer(s) that was/were:</p> <p>☐ accepted (DISQ or DISQ.E.FILE) and of record in the prosecution of the underlying patent and/or reexamination proceeding(s) of the underlying patent. (Enter application/control no(s) and terminal disclaimer(s) filing date(s) below).</p> <p style="text-align: center;"> 1. _____ 2. _____ 3. _____ </p>		

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L2	2	"8198563".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/10 10:02 AM
L3	1	RE49287.pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/10 10:04 AM
L4	14	("4253719" OR "4258969" OR "4421371" OR "5135406" OR "5293013" OR "5496186" OR "5518416" OR "5772448" OR "6095861" OR "6127941" OR "6132223" OR "6132254" OR "6190190" OR "6257930").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:28 AM
L5	19	(US-3795037-\$ US-3808577-\$ US-3810258-\$ US-4537459-\$ US-4700998-\$ US-4822303-\$ US-5295843-\$ US-5431578-\$ US-5445528-\$ US-5542850-\$ US-5591050-\$ US-5595503-\$ US-5644470-\$ US-5773901-\$ US-5800220-\$ US-5941728-\$ US-6033247-\$ US-6074225-\$ US-6352450-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:29 AM
L6	19	(US-3795037-\$ US-3808577-\$ US-3810258-\$ US-4537459-\$ US-4700998-\$ US-4822303-\$ US-5295843-\$ US-5431578-\$ US-5445528-\$ US-5542850-\$ US-5591050-\$ US-5595503-\$ US-	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:33 AM

L7	15	5644470-\$ US- 5773901-\$ US- 5800220-\$ US- 5941729-\$ US- 6033247-\$ US- 6074225-\$ US- 6352450-\$).DID. ("4253719" OR "4258969" OR "4421371" OR "5135406" OR "5293013" OR "5496186" OR "5518416" OR "5772448" OR "6095861" OR "6127941" OR "6132223" OR "6132254" OR "6190190" OR "6257930" OR "5964610").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:34 AM
L8	34	L6 OR L7	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:36 AM
L10	17	("6364699" OR "6530793" OR "6565366" OR "6609928" OR "6744634" OR "6854984" OR "6901457" OR "6971915" OR "6981887" OR "7001201" OR "7059914" OR "7090541" OR "7150651" OR "7165998" OR "7198522" OR "7249978" OR "7269004").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:18 PM
L11	22	(US-6394813-\$ US- 6417718-\$ US- 6461192-\$ US- 6544075-\$ US- 6599152-\$ US- 6792487-\$ US- 6796844-\$ US- 6840806-\$ US- 6887108-\$ US- 6948983-\$ US- 6962510-\$ US- 6964582-\$ US- 6991483-\$ US- 7001192-\$ US- 7037120-\$ US-	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:20 PM

L12	73	7094086-\$ US- 7094089-\$ US- 7155545-\$ US- 7160125-\$ US- 7182646-\$ US- 7275940-\$ US- 7300320-\$).DID. L8 OR L10 OR L11	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:21 PM
L13	17	("7314383" OR "7318752" OR "7341458" OR "7347747" OR "7359208" OR "7361059" OR "7363947" OR "7387539" OR "7402086" OR "7467977" OR "7572153" OR "7604512" OR "7628619" OR "7635280" OR "7670156" OR "7710736" OR "7740499").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:48 PM
L14	21	(US-7329128-\$ US- 7352601-\$ US- 7354314-\$ US- 7407390-\$ US- 7416413-\$ US- 7440286-\$ US- 7458825-\$ US- 7462071-\$ US- 7465181-\$ US- 7470160-\$ US- 7500861-\$ US- 7517253-\$ US- 7547218-\$ US- 7553172-\$ US- 7591657-\$ US- 7601034-\$ US- 7628655-\$ US- 7641519-\$ US- 7654871-\$ US- 7682169-\$ US- 7731535-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:48 PM
L15	18	("7314383" OR "7318752" OR "7341458" OR "7347747" OR "7359208" OR "7361059" OR "7363947" OR "7387539" OR "7402086" OR	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:54 PM

		"7467977" OR "7572153" OR "7604512" OR "7628619" OR "7635280" OR "7670156" OR "7710736" OR "7740499" OR "7440287").pn.					
L16	112	L12 OR L14 OR L15	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:01 PM
L17	2	("7918689" OR RE49287).pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:16 PM
L18	8	(US-8043699-\$ US- 8073985-\$ US- 8079879-\$ US- 8167638-\$ US- 8198563-\$ US- 8241047-\$ US- 8257287-\$ US- 8328434-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:17 PM
L19	122	L16 OR L17 OR L18	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:17 PM
L20	18	("20030100203" OR "20030171035" OR "20040023560" OR "20040103228" OR "20040115990" OR "20050186810" OR "20060024997" OR "20060056401" OR "20060094301" OR "20060183371" OR "20070049115" OR "20070072491" OR "20070173129" OR "20070281524" OR "20080030963" OR "20080064271" OR "20080067248" OR "20080119076").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:32 PM
L21	10	(US-20040023559-\$ US-20050079738-\$ US-20050124218-\$ US-20070010115-\$ US-20070058332-\$ US-20070197053-\$ US-20070202725-\$ US-20070202750-\$ US-20070243726-\$ US-20070300023-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:32 PM
L23	19	("20030100203" OR "20030171035" OR "20040023560" OR	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:37 PM

L24	151	"20040103228" OR "20040115990" OR "20050186810" OR "20060024997" OR "20060056401" OR "20060094301" OR "20060183371" OR "20070049115" OR "20070072491" OR "20070173129" OR "20070281524" OR "20080030963" OR "20080064271" OR "20080067248" OR "20080119076" OR "20050186850").pn. L19 OR L21 OR L23	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:38 PM
L25	11	("20080130207" OR "20080218799" OR "20080274633" OR "20080305651" OR "20080311781" OR "200960011621" OR "20090017683" OR "20090156055" OR "20090176386" OR "20090318026" OR "20100075517" OR "20100190382" OR "2010221936").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:48 PM
L26	7	(US-20080200072-\$ US-20080242149-\$ US-20080254680-\$ US-20080299833-\$ US-20090258539-\$ US-20090042421-\$ US-20100081337-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:49 PM
L27	18	L25 OR L26	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:58 PM
L28	1	"20100221936".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:59 PM
L29	19	L27 OR L28	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:00 PM
L30	1	"20090011621".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:01 PM
L31	20	L29 OR L30	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:01 PM
L32	171	L24 OR L31	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:02 PM
L33	3	"20060024997".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/17 11:48 AM

L34	2	"20090258539".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/17 11:59 AM
L35	3	((("KIWI") near3 ("CONNECTION") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/20 03:28 PM
L36	10	((("KIWI") near3 ("CONNECTION") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/20 03:28 PM
L37	87	((("TSAI") near3 ("Chou") near3 ("Hsien"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 03:29 PM
L38	221	((("TSAI") near3 ("Chou") near3 ("Hsien"))).INV.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/20 03:29 PM
L39	7645	H01R29/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:02 PM
L40	10263	H01R27/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:02 PM
L41	9599	H01R12/58.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:02 PM
L42	26781	H01R12/716.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:03 PM
L43	5076	H01R13/658.cpc.	(US-PGPUB; USPAT;	OR	ON	ON	2024/06/20

L44	3929	H01R13/642.cpc.	USOCR; FPRS; EPO; JPO; DERWENT) (US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	04:03 PM 2024/06/20 04:03 PM
L45	14652	H01R13/64.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:03 PM
L46	2143	H05K5/0278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:04 PM
L47	6247	G06K19/07732.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:04 PM
L48	80165	L39 OR L40 OR L41 OR L42 OR L43 OR L44 OR L45 OR L46 OR L47	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:28 AM
L53	14	L48 AND (socket SAME tongue SAME reversible)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:30 AM
L54	109	L48 AND (socket SAME tongue SAME ((two OR mutiple OR plural) WITH plug\$1))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:35 AM
L55	33	(Artificial Intelligence) More like doc: US-20120015561-A1 Text: (US-9142926-B2 OR US-10074947-B2 OR US-20150288115-A1 OR US-20190006798-A1 OR US-20190006799-A1 OR US-10680393-B2 OR US-20190006800-A1 OR US-11600959-B2 OR US-20210242642-A1 OR US-10826254-B2 OR US-10559932-B2 OR US-RE49287-E OR US-20100267282-A1 OR US-9178310-B2 OR US-20130005193-A1 OR US-20170279226-A1 OR US-10297954-B2 OR US-20100279520-A1 OR US-10680384-B2 OR CN-102340069-A).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/01 10:41 AM
L56	32	L48 AND (socket AND tongue AND reversible)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:46 AM

L57	317	L48 AND (socket AND tongue AND ((two OR multiple OR plural) WITH plug\$1))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:49 AM
L58	208	L57 NOT L54	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:49 AM
L59	4	WO-2009069969-\$.did.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 11:04 AM
L60	4	"7160125".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 11:06 AM
L61	3	"20060024997".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 11:35 AM
L62	3	L2 OR L3	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 01:20 PM
L63	3	L62 AND height	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 01:20 PM
L64	3	L62 AND simultaneously	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 01:34 PM
L65	11	((US-8198563-B2 OR US-7361059-B2 OR US-6981887-B1 OR US-RE49287-E OR US-7160125-B1).did. AND USPT.dbnm.) OR ((US-20090156055-A1 OR US-20060024997-A1 OR US-20100221936-A1).did. AND PGPB.dbnm.) OR ((WO-2009069969-A2).did. AND EPAB.dbnm.) OR ((US-7160125-B1 OR US-20060024997-A1).did. AND DWPI.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/01 01:51 PM
L66	5	L65 AND metal\$3	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/01 01:51 PM
L67	3	L62 AND metal	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR,	OR	ON	ON	2024/07/01 01:52 PM

L68	3	"7361059".pn.	GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 02:01 PM
L69	1937176	@pd>"20240701"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/10/23 10:18 AM
L70	719	L69 AND (L36 OR L38 OR L39 OR L40 OR L41 OR L42 OR L45 OR L44 OR L43 OR L46 OR L47)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/10/23 10:21 AM
L71	252619	@pd>"20241001"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/11/07 11:17 AM
L72	837	L70 AND (L36 OR L38 OR L39 OR L40 OR L41 OR L42 OR L45 OR L44 OR L43 OR L46 OR L47)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/11/07 11:18 AM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

OK TO ENTER: /W.E.D/ 11/07/2024

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Chou Hsien Tsai	)	Group Art Unit: 3993
Application No.: 17/974,866 (Reissue of USPN 8,198,563)	)	Examiner: WILLIAM E DONDERO
Filed: October 27, 2022	)	Confirmation No.: 1048
Atty. File No.: 123151.0001.1_KIWI-1REIC	)	

For: SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

REQUEST FOR RECONSIDERATION AFTER FINAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Applicant submits this Request for Reconsideration After Final to address the Final Office Action having a mailing date of November 1, 2024. Please credit any overpayment or charge any underpayment to Deposit Account No. 09-0528.

Applicant expressly thanks Ex. Dondero for the indication that claims 35-136 are allowed.

Submitted herewith is a new declaration as requested by the Examiner to address the remaining outstanding rejection.

As such, the 35 U.S.C. §251 rejection has been overcome.

Withdrawal of the rejection is respectfully requested.

With all objections and rejections having been overcome, Applicant respectfully submits the application is in condition for allowance.

A Notice of Allowance is respectfully solicited.

Should the Examiner believe anything further is desirable in order to place the application in an even better condition for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the telephone number or email address listed below.

The Commissioner is hereby authorized to charge to deposit account number 09-0528 any fees under 37 CFR § 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and has not been separately requested, such extension is hereby Petitioned.

Respectfully submitted,

WOMBLE BOND DICKINSON (US) LLP

Date: November 5, 2024

By: /Jason H. Vick/

Jason H. Vick

Reg. No. 45,285

1899 Wynkoop Street, Suite 750

Denver, CO 80202

Telephone: 720-983-1336

jason.vick@wbd-us.com

Bibliographic Data

Application No: 17/974,866

Foreign Priority claimed: ☒ Yes ☐ No

35 USC 119 (a-d) conditions met: ☒ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged:

/WILLIAM E DONDERO/

/WED/

Examiner's Signature

Initials

Title:

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL
CONNECTION

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/27/2022	439	3993	KIWI-1-REI-CON
RULE			

APPLICANTS

KIWI INTELLECTUAL ASSETS CORPORATION, NEW TAIPEI CITY, TAIWAN

INVENTORS

Chou Hsien Tsai, New Taipei City, TAIWAN

CONTINUING DATA

This application is a CON of 17020359 09/14/2020 PAT RE49287

This application is a REI of 12759408 04/13/2010 PAT 8198563

17020359 is a REI of 12759408 04/13/2010 PAT 8198563

FOREIGN APPLICATIONS

TAIWAN TW098112573 04/15/2009

TAIWAN TW098117405 05/26/2009

TAIWAN TW098210021 06/05/2009

TAIWAN TW099100847 01/13/2010

IF REQUIRED, FOREIGN LICENSE GRANTED**

10/27/2022

** SMALL ENTITY **

STATE OR COUNTRY

TAIWAN

ADDRESS

Jason H. Vick

WOMBLE BOND DICKINSON (US) LLP

2370 E. 160th PL

Thornton, CO 80602

UNITED STATES

FILING FEE RECEIVED

\$1,670



UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
17/974,866

RECEIPT DATE / TIME
11/05/2024 03:27:44 PM Z ET

ATTORNEY DOCKET #
KIWI-1-REI-CON

Title of Invention

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

Application Information

APPLICATION TYPE Utility - Reissue

PATENT # -

CONFIRMATION # 1048

FILED BY Joanne Vos

PATENT CENTER # 67850298

FILING DATE 10/27/2022

CUSTOMER # 62574

FIRST NAMED INVENTOR Chou Hsien Tsai

CORRESPONDENCE ADDRESS -

AUTHORIZED BY Jason Vick

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
AMEND_02_AF_KIWI-1-REI-CON.pdf	2	Response After Final Action	78 KB
Executed_Reissue_Declaration_KIWI_1-REI-CON.pdf	2	Reissue Oath or Declaration	5252 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
AMEND_02_AF_KIWI-1-REI-CON.pdf	AB416EE8F9248DE401B7D399B697134764794A99BB5DC905E EA639EA9A6FD7E711393A1844F169EAD574416128A6903BC6 C87A143201613F1129D336C7BF1702
Executed_Reissue_Declaration_KIWI_1-REI-CON.pdf	F8A02517C9B2C8F7B296969E2E1B96F4F5545FDFCB35162F5 24D5AE86812F3BF138F3C3E47AD6A13B97C7CF3911E9FF267

CA20A5D7C8F25E5B69426B1B3B536D

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

REISSUE APPLICATION DECLARATION BY THE INVENTOR	Docket Number (Optional) KIWI-1-REI-CON
<p>I hereby declare that: Each inventor's residence and mailing address are stated below next to their name. I believe I am the original inventor or an original joint inventor of the subject matter which is described and claimed in patent number <u>6,158,563</u> granted <u>June 12, 2003</u> and for which a reissue patent is sought on the invention titled <u>SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION</u> the specification of which</p> <p>☐ is attached hereto. ☒ was filed on <u>October 27, 2022</u> as reissue application number <u>17/974,866</u></p> <p>The above-identified application was made or authorized to be made by me.</p> <p>I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both</p> <p>I believe the original patent to be wholly or partly inoperative or invalid, for the reasons described below. (Check all boxes that apply.)</p> <p>☐ by reason of a defective specification or drawing. ☒ by reason of the patentee claiming more or less than he had the right to claim in the patent. ☐ by reason of other errors.</p> <p>At least one error upon which reissue is based is described below. If the reissue is a broadening reissue, a claim that the application seeks to broaden must be identified:</p> <p>At least one error upon which the subject reissue is based is that the patentee claimed more or less than they had the right to claim in the patent, and have therefore included at least the narrowing feature in claim 68 that "... the at least one row of first contacts includes at least six contacts, the at least one row of second contacts includes at least six contacts, the socket structure is operative to simultaneously electrically connect via the first and second contacts..." The originally patented claims fail to claim at least this specific combination of features.</p>	

[Page 1 of 2]

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0033. Public burden for this form is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden, to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

(REISSUE APPLICATION DECLARATION BY THE INVENTOR, page 2)		Docket Number (Optional) KIWI-1-REI-CON	
<p>Note: To appoint a power of attorney, use form PTO/AIA/81.</p> <p>Correspondence Address. Direct all communications about the application to:</p> <p>☒ The address associated with Customer Number: 62574</p> <p>OR</p>			
<p>☐ Firm or Individual Name</p>			
Address			
City		State	Zip
Country			
Telephone		Email	
<p>WARNING:</p> <p>Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.</p>			
Legal name of sole or first inventor (E.g., Given Name (first and middle (if any) and Family Name or Surname)			
Chou Hsien Tsai			
Inventor's Signature		Date (Optional)	
CHOU HSIEN TSAI		04. NOV. 2024	
Residence: City		State	Country
New Taipei City			TW
Mailing Address			
8F -2, No. 1, Wuquan 1st Rd., Xinzhuang Dist.			
City		State	Zip
New Taipei City			242
		Country	
		TW	
Additional joint inventors are named on the _____ supplemental sheet(s) PTO/AIA/10 attached hereto.			

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Chou Hsien Tsai	)	Group Art Unit: 3993
Application No.: 17/974,866 (Reissue of USPN 8,198,563)	)	Examiner: WILLIAM E DONDERO
Filed: October 27, 2022	)	Confirmation No.: 1048
Atty. File No.: 123151.0001.1_KIWI-1REIC	)	

For: SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

REQUEST FOR RECONSIDERATION AFTER FINAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Applicant submits this Request for Reconsideration After Final to address the Final Office Action having a mailing date of November 1, 2024. Please credit any overpayment or charge any underpayment to Deposit Account No. 09-0528.

Applicant expressly thanks Ex. Dondero for the indication that claims 35-136 are allowed.

Submitted herewith is a new declaration as requested by the Examiner to address the remaining outstanding rejection.

As such, the 35 U.S.C. §251 rejection has been overcome.

Withdrawal of the rejection is respectfully requested.

With all objections and rejections having been overcome, Applicant respectfully submits the application is in condition for allowance.

A Notice of Allowance is respectfully solicited.

Should the Examiner believe anything further is desirable in order to place the application in an even better condition for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the telephone number or email address listed below.

The Commissioner is hereby authorized to charge to deposit account number 09-0528 any fees under 37 CFR § 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and has not been separately requested, such extension is hereby Petitioned.

Respectfully submitted,

WOMBLE BOND DICKINSON (US) LLP

Date: November 5, 2024

By: /Jason H. Vick/

Jason H. Vick

Reg. No. 45,285

1899 Wynkoop Street, Suite 750

Denver, CO 80202

Telephone: 720-983-1336

jason.vick@wbd-us.com



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	10/27/2022	Chou Hsien Tsai	KIWI-1-REI-CON	1048
62574	7590	11/01/2024		
Jason H. Vick WOMBLE BOND DICKINSON (US) LLP 2370 E. 160th PL Thornton, CO 80602			EXAMINER DONDERO, WILLIAM E	
			ART UNIT	PAPER NUMBER
			3993	
			NOTIFICATION DATE	DELIVERY MODE
			11/01/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jason.vick@wbd-us.com
joanne.vos@wbd-us.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

Reissue Applications

For reissue applications filed before September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the law and rules in effect on September 15, 2012. Where specifically designated, these are “pre-AIA” provisions.

For reissue applications filed on or after September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the current provisions.

Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. 8,198,563 is or was involved. These proceedings would include any trial before the Patent Trial and Appeal Board, interferences, reissues, reexaminations, supplemental examinations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

Reissue Oath/Declaration

The reissue oath/declaration filed with this application is defective because the error which is relied upon to support the reissue application is not an error upon which a reissue can be based. See 37 CFR 1.175 and MPEP § 1414.

The reissue applicant filed two reissue declarations, i.e., reissue application declaration by the assignee and reissue application declaration by the inventor, accompanied by the instant reissue application. In the declarations, the respective declarant alleges that there exists at least one error upon which the subject reissue is based is the inclusion of claims 7-11, 16, 17, 20, 23, 25, and 27-33 in the '563 Patent because an apparent administrative error by the Office by including the non-elected claims 7-11, 16, 17, 20, 23, 25, and 27-33 in the '563 Patent.

The instant reissue application is filed to correct the administrative error in the '563 Patent, wherein the correction to the '563 Patent is an editorial or clerical error which does not cause the '563 Patent to be deemed wholly or partly inoperative or invalid' for the reasons specified in 35 U.S.C. § 251.

Furthermore, as mentioned in the above, the reissue applicant submitted two reissue declarations, i.e., reissue application declaration by the assignee and reissue application declaration by the inventor. Reissue application declaration by the inventor (form PT O/AIA/05) or reissue application declaration by the assignee (form PT O/AIA/06) may be used to prepare a declaration in a reissue application depending on the circumstances; however, filing both reissue application declaration by the assignee and reissue application declaration by the inventor at the same time is not acceptable. See MPEP § 1414.01.

Therefore, the declared error and its correction to the '563 Patent does not provide a basis for reissue although this correction may also be included in a reissue application, where a 35 U.S.C. § 251 error is already present. See MPEP § 1402.

The reissue oath/declaration filed with this application is defective because it fails to identify at least one error which is relied upon to support the reissue application. See 37 CFR 1.175 and MPEP § 1414.

The reissue oath/declaration filed October 27, 2022 is a copy of the reissue oath/declaration filed in parent reissue application 17/020,359. As such, the reissue application is based on an oath/declaration that does not identify an error being corrected by the continuation reissue application and a new oath/declaration is required that identifies a new error or a statement explaining compliance with 37 CFR 1.175(f)(2) if appropriate. See MPEP § 1414 II.D.1.

MPEP 1414 II.D.1:

(D) For continuation or divisional reissue applications:

(1) Where a continuation reissue application is filed with a copy of the reissue oath/declaration from the parent reissue application, and the parent reissue application is not to be abandoned, the reissue oath/declaration should be accepted by the Office of Patent Application Processing (OPAP) without further evaluation, because it is an oath/declaration, albeit improper under 35 U.S.C. 251. The examiner should, however, reject the claims of the continuation reissue application under 35 U.S.C. 251 as being based on an oath/declaration that does not identify an error being corrected by the continuation reissue application, and should require a new oath/declaration that identifies a new error or a statement explaining compliance with 37 CFR 1.175(f)(2) if appropriate. If the same error corrected in the parent is also being corrected in the continuation reissue application, but the error is being corrected in a different way, a statement is needed to explain compliance with 37 CFR 1.175(f)(2) for a reissue application filed on or after September 16, 2012. For these applications, a petition under 37 CFR 1.183 is not needed. For a reissue application filed before September 16, 2012, a petition under 37 CFR 1.183 will be needed to waive pre-AIA 37 CFR 1.175(e) in order to rely on the same error identified in the parent but being corrected in a different way. See 37 CFR 1.175(f)(2) for reissue applications filed on or after September 16, 2012, and pre-AIA 37 CFR 1.175(e) for reissue applications filed before September 16, 2012. One of form paragraphs 14.01.01, 14.01.02, or 14.01.03 may be used.

Claim Rejections – 35 USC § 251

Claims 35-136 are rejected as being based upon a defective reissue declaration under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175.

The nature of the defect(s) in the declaration is set forth in the discussion above in this Office action.

Allowable Subject Matter

Claims 35-136 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record, when taken as a whole, does not disclose or suggest the combinations of claim 35 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect via first and second contacts in conjunction with the rest of the limitations of claim 35; claim 57 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect on the top and bottom side of the tongue in conjunction with the rest of the limitations of claim 57; claim 68 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect via first and second contacts in conjunction with the rest of the limitations of claim 68; claim 79 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect via first and second contacts in conjunction with the rest of the limitations of claim 79; claim 89 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect via first and second contacts in conjunction with the rest of the limitations of claim 89; claim 99 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect via first and second contacts in conjunction with the rest of the limitations of claim 99; claim 109 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect via first and second contacts in conjunction

with the rest of the limitations of claim 109; claim 111 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect on the top and bottom side of the tongue in conjunction with the rest of the limitations of claim 111; claim 113 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect on the top and bottom side of the tongue in conjunction with the rest of the limitations of claim 113; claim 115 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect via first and second contacts in conjunction with the rest of the limitations of claim 115; claim 116 including a socket structure with duplex electrical connection, wherein the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue in conjunction with the rest of the limitations of claim 116; claim 117 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect on both sides of the tongue via first and second contacts in conjunction with the rest of the limitations of claim 117; claim 118 including a socket structure with duplex electrical connection, wherein the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and bottom side of the tongue in conjunction with the rest of the limitations of claim 118; claim 119 including a socket structure with duplex electrical connection, wherein the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue in conjunction with the rest of the limitations of claim 119; claim 120 including a socket structure with duplex electrical connection, wherein the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue in conjunction with the rest of the limitations of claim 120; claim 121 including a socket structure with duplex electrical connection, wherein the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue in conjunction with the rest of

the limitations of claim 121; claim 122 including a socket structure with duplex electrical connection, wherein the tongue operative for signal transmission on one side when connected in a first configuration, and operative for signal transmission simultaneously on both sides when connected in a second configuration in conjunction with the rest of the limitations of claim 122; claim 125 including a socket structure with duplex electrical connection, wherein the tongue operative for signal transmission on one side when connected in a first configuration, and operative for signal transmission simultaneously on both sides when connected in a second configuration in conjunction with the rest of the limitations of claim 125; claim 128 including a socket structure with duplex electrical connection, wherein the tongue is operative for signal transmission on one side when connected in a first configuration, and operative for signal transmission simultaneously on both sides when connected in a second configuration in conjunction with the rest of the limitations of claim 128; claim 131 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect via first and second contacts in conjunction with the rest of the limitations of claim 131; claim 132 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect on the top and bottom side of the tongue in conjunction with the rest of the limitations of claim 132; claim 133 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect on the top and bottom side of the tongue in conjunction with the rest of the limitations of claim 133; claim 134 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect via first and second contacts in conjunction with the rest of the limitations of claim 134; claim 135 including a socket structure with duplex electrical connection, wherein the socket structure is operative to simultaneously electrically connect on the top and bottom side of the tongue in conjunction with the rest of the limitations of claim 135; and claim 136 including a socket structure with duplex electrical connection,

wherein the socket structure is operative to simultaneously electrically connect on the top and bottom side of the tongue in conjunction with the rest of the limitations of claim 136.

Response to Arguments

With respect to Applicant's arguments start on page 43, line 6 to page 43, line 16, Applicant presented a proposed error statement, but did not provide the error statement in a properly executed oath, as such the declaration objection and 35 USC 251 rejection is maintained until a properly executed declaration is filed. The proposed error statement is acceptable. Once it is provided in a properly executed Reissue Declaration filed in the application, a notice of allowance will be sent in the application.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM E DONDERO whose telephone number is (571)272-5590. The examiner can normally be reached Monday-Friday 6 am - 4 pm ET, Alternate Fridays.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, PATRICIA L ENGLE can be reached on 571-272-6660. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/WILLIAM E DONDERO/
Reexamination Specialist, Art Unit 3993

CONFEREES: /WILLIAM C DOERRLER/
Reexamination Specialist, Art Unit 3993

/Patricia L Engle/
SPRS, Art Unit 3993

<i>Search Notes</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

CPC - Searched*		
Symbol	Date	Examiner
H01R 29/00	07/01/2024	/WED/
H01R 27/00	07/01/2024	/WED/
H01R 12/58,716	07/01/2024	/WED/
H01R 13/64,642,658	07/01/2024	/WED/
H05K 5/0278	07/01/2024	/WED/
G06K 19/07732	07/01/2024	/WED/

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

--	--

<i>Search Notes</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

Search Notes		
Search Notes	Date	Examiner
Text Search - see attached printout	07/01/2024	/WED/
Applicant/Assignee Search	07/01/2024	/WED/
Inventor Name Search	07/01/2024	/WED/
PDP (Patent Data Portal) Continuity Search	07/01/2024	/WED/
Reviewed Underlying patent file wrapper for US 8,198,563 (12/759,408)	07/01/2024	/WED/
Review Parent Reissue Application/Patent RE49,287 (17/020,359)	07/01/2024	/WED/
PTACTS for AIA Proceedings: None	07/01/2024	/WED/
All Above Updated	10/23/2024	/WED/

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

--	--

<i>Index of Claims</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant					☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE								
Final	Original	07/08/2024	10/28/2024							
	1	-	-							
	2	-	-							
	3	-	-							
	4	-	-							
	5	-	-							
	6	-	-							
	7	-	-							
	8	-	-							
	9	-	-							
	10	-	-							
	11	-	-							
	12	-	-							
	13	-	-							
	14	-	-							
	15	-	-							
	16	-	-							
	17	-	-							
	18	-	-							
	19	-	-							
	20	-	-							
	21	-	-							
	22	-	-							
	23	-	-							
	24	-	-							
	25	-	-							
	26	-	-							
	27	-	-							
	28	-	-							
	29	-	-							
	30	-	-							
	31	-	-							
	32	-	-							
	33	-	-							
	34	-	-							
	35	✓	✓							
	36	✓	✓							
	37	✓	✓							
	38	✓	✓							
	39	✓	✓							
	40	✓	✓							
	41	✓	✓							
	42	✓	✓							

<i>Index of Claims</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

CLAIM		DATE							
Final	Original	07/08/2024	10/28/2024						
	43	✓	✓						
	44	✓	✓						
	45	✓	✓						
	46	✓	✓						
	47	✓	✓						
	48	✓	✓						
	49	✓	✓						
	50	✓	✓						
	51	✓	✓						
	52	✓	✓						
	53	✓	✓						
	54	✓	✓						
	55	✓	✓						
	56	✓	✓						
	57	✓	✓						
	58	✓	✓						
	59	✓	✓						
	60	✓	✓						
	61	✓	✓						
	62	✓	✓						
	63	✓	✓						
	64	✓	✓						
	65	✓	✓						
	66	✓	✓						
	67	✓	✓						
	68	✓	✓						
	69	✓	✓						
	70	✓	✓						
	71	✓	✓						
	72	✓	✓						
	73	✓	✓						
	74	✓	✓						
	75	✓	✓						
	76	✓	✓						
	77	✓	✓						
	78	✓	✓						
	79	✓	✓						
	80	✓	✓						
	81	✓	✓						
	82	✓	✓						
	83	✓	✓						
	84	✓	✓						
	85	✓	✓						
	86	✓	✓						
	87	✓	✓						
	88	✓	✓						
	89	✓	✓						
	90	✓	✓						
	91	✓	✓						
	92	✓	✓						
	93	✓	✓						
	94	✓	✓						

<i>Index of Claims</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

CLAIM		DATE							
Final	Original	07/08/2024	10/28/2024						
	95	✓	✓						
	96	✓	✓						
	97	✓	✓						
	98	✓	✓						
	99	✓	✓						
	100	✓	✓						
	101	✓	✓						
	102	✓	✓						
	103	✓	✓						
	104	✓	✓						
	105	✓	✓						
	106	✓	✓						
	107	✓	✓						
	108	✓	✓						
	109	✓	✓						
	110	✓	✓						
	111	✓	✓						
	112	✓	✓						
	113	✓	✓						
	114	✓	✓						
	115	✓	✓						
	116	✓	✓						
	117	✓	✓						
	118	✓	✓						
	119	✓	✓						
	120	✓	✓						
	121	✓	✓						
	122	✓	✓						
	123	✓	✓						
	124	✓	✓						
	125	✓	✓						
	126	✓	✓						
	127	✓	✓						
	128	✓	✓						
	129	✓	✓						
	130	✓	✓						
	131	✓	✓						
	132	✓	✓						
	133	✓	✓						
	134	✓	✓						
	135	✓	✓						
	136	✓	✓						

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L2	2	"8198563".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/10 10:02 AM
L3	1	RE49287.pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/10 10:04 AM
L4	14	("4253719" OR "4258969" OR "4421371" OR "5135406" OR "5293013" OR "5496186" OR "5518416" OR "5772448" OR "6095861" OR "6127941" OR "6132223" OR "6132254" OR "6190190" OR "6257930").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:28 AM
L5	19	(US-3795037-\$ US-3808577-\$ US-3810258-\$ US-4537459-\$ US-4700998-\$ US-4822303-\$ US-5295843-\$ US-5431578-\$ US-5445528-\$ US-5542850-\$ US-5591050-\$ US-5595503-\$ US-5644470-\$ US-5773901-\$ US-5800220-\$ US-5941728-\$ US-6033247-\$ US-6074225-\$ US-6352450-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:29 AM
L6	19	(US-3795037-\$ US-3808577-\$ US-3810258-\$ US-4537459-\$ US-4700998-\$ US-4822303-\$ US-5295843-\$ US-5431578-\$ US-5445528-\$ US-5542850-\$ US-5591050-\$ US-5595503-\$ US-	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:33 AM

L7	15	5644470-\$ US- 5773901-\$ US- 5800220-\$ US- 5941729-\$ US- 6033247-\$ US- 6074225-\$ US- 6352450-\$).DID. ("4253719" OR "4258969" OR "4421371" OR "5135406" OR "5293013" OR "5496186" OR "5518416" OR "5772448" OR "6095861" OR "6127941" OR "6132223" OR "6132254" OR "6190190" OR "6257930" OR "5964610").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:34 AM
L8	34	L6 OR L7	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:36 AM
L10	17	("6364699" OR "6530793" OR "6565366" OR "6609928" OR "6744634" OR "6854984" OR "6901457" OR "6971915" OR "6981887" OR "7001201" OR "7059914" OR "7090541" OR "7150651" OR "7165998" OR "7198522" OR "7249978" OR "7269004").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:18 PM
L11	22	(US-6394813-\$ US- 6417718-\$ US- 6461192-\$ US- 6544075-\$ US- 6599152-\$ US- 6792487-\$ US- 6796844-\$ US- 6840806-\$ US- 6887108-\$ US- 6948983-\$ US- 6962510-\$ US- 6964582-\$ US- 6991483-\$ US- 7001192-\$ US- 7037120-\$ US-	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:20 PM

L12	73	7094086-\$ US- 7094089-\$ US- 7155545-\$ US- 7160125-\$ US- 7182646-\$ US- 7275940-\$ US- 7300320-\$).DID. L8 OR L10 OR L11	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:21 PM
L13	17	("7314383" OR "7318752" OR "7341458" OR "7347747" OR "7359208" OR "7361059" OR "7363947" OR "7387539" OR "7402086" OR "7467977" OR "7572153" OR "7604512" OR "7628619" OR "7635280" OR "7670156" OR "7710736" OR "7740499").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:48 PM
L14	21	(US-7329128-\$ US- 7352601-\$ US- 7354314-\$ US- 7407390-\$ US- 7416413-\$ US- 7440286-\$ US- 7458825-\$ US- 7462071-\$ US- 7465181-\$ US- 7470160-\$ US- 7500861-\$ US- 7517253-\$ US- 7547218-\$ US- 7553172-\$ US- 7591657-\$ US- 7601034-\$ US- 7628655-\$ US- 7641519-\$ US- 7654871-\$ US- 7682169-\$ US- 7731535-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:48 PM
L15	18	("7314383" OR "7318752" OR "7341458" OR "7347747" OR "7359208" OR "7361059" OR "7363947" OR "7387539" OR "7402086" OR	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:54 PM

		"7467977" OR "7572153" OR "7604512" OR "7628619" OR "7635280" OR "7670156" OR "7710736" OR "7740499" OR "7440287").pn.					
L16	112	L12 OR L14 OR L15	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:01 PM
L17	2	("7918689" OR RE49287).pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:16 PM
L18	8	(US-8043699-\$ US- 8073985-\$ US- 8079879-\$ US- 8167638-\$ US- 8198563-\$ US- 8241047-\$ US- 8257287-\$ US- 8328434-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:17 PM
L19	122	L16 OR L17 OR L18	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:17 PM
L20	18	("20030100203" OR "20030171035" OR "20040023560" OR "20040103228" OR "20040115990" OR "20050186810" OR "20060024997" OR "20060056401" OR "20060094301" OR "20060183371" OR "20070049115" OR "20070072491" OR "20070173129" OR "20070281524" OR "20080030963" OR "20080064271" OR "20080067248" OR "20080119076").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:32 PM
L21	10	(US-20040023559-\$ US-20050079738-\$ US-20050124218-\$ US-20070010115-\$ US-20070058332-\$ US-20070197053-\$ US-20070202725-\$ US-20070202750-\$ US-20070243726-\$ US-20070300023-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:32 PM
L23	19	("20030100203" OR "20030171035" OR "20040023560" OR	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:37 PM

L24	151	"20040103228" OR "20040115990" OR "20050186810" OR "20060024997" OR "20060056401" OR "20060094301" OR "20060183371" OR "20070049115" OR "20070072491" OR "20070173129" OR "20070281524" OR "20080030963" OR "20080064271" OR "20080067248" OR "20080119076" OR "20050186850").pn. L19 OR L21 OR L23	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:38 PM
L25	11	("20080130207" OR "20080218799" OR "20080274633" OR "20080305651" OR "20080311781" OR "200960011621" OR "20090017683" OR "20090156055" OR "20090176386" OR "20090318026" OR "20100075517" OR "20100190382" OR "2010221936").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:48 PM
L26	7	(US-20080200072-\$ US-20080242149-\$ US-20080254680-\$ US-20080299833-\$ US-20090258539-\$ US-20090042421-\$ US-20100081337-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:49 PM
L27	18	L25 OR L26	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:58 PM
L28	1	"20100221936".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:59 PM
L29	19	L27 OR L28	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:00 PM
L30	1	"20090011621".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:01 PM
L31	20	L29 OR L30	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:01 PM
L32	171	L24 OR L31	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:02 PM
L33	3	"20060024997".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/17 11:48 AM

L34	2	"20090258539".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/17 11:59 AM
L35	3	((("KIWI") near3 ("CONNECTION") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/20 03:28 PM
L36	10	((("KIWI") near3 ("CONNECTION") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/20 03:28 PM
L37	87	((("TSAI") near3 ("Chou") near3 ("Hsien"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 03:29 PM
L38	221	((("TSAI") near3 ("Chou") near3 ("Hsien"))).INV.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/20 03:29 PM
L39	7645	H01R29/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:02 PM
L40	10263	H01R27/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:02 PM
L41	9599	H01R12/58.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:02 PM
L42	26781	H01R12/716.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:03 PM
L43	5076	H01R13/658.cpc.	(US-PGPUB; USPAT;	OR	ON	ON	2024/06/20

L44	3929	H01R13/642.cpc.	USOCR; FPRS; EPO; JPO; DERWENT) (US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	04:03 PM 2024/06/20 04:03 PM
L45	14652	H01R13/64.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:03 PM
L46	2143	H05K5/0278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:04 PM
L47	6247	G06K19/07732.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:04 PM
L48	80165	L39 OR L40 OR L41 OR L42 OR L43 OR L44 OR L45 OR L46 OR L47	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:28 AM
L53	14	L48 AND (socket SAME tongue SAME reversible)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:30 AM
L54	109	L48 AND (socket SAME tongue SAME ((two OR mutiple OR plural) WITH plug\$1))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:35 AM
L55	33	(Artificial Intelligence) More like doc: US-20120015561-A1 Text: (US-9142926-B2 OR US-10074947-B2 OR US-20150288115-A1 OR US-20190006798-A1 OR US-20190006799-A1 OR US-10680393-B2 OR US-20190006800-A1 OR US-11600959-B2 OR US-20210242642-A1 OR US-10826254-B2 OR US-10559932-B2 OR US-RE49287-E OR US-20100267282-A1 OR US-9178310-B2 OR US-20130005193-A1 OR US-20170279226-A1 OR US-10297954-B2 OR US-20100279520-A1 OR US-10680384-B2 OR CN-102340069-A).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/01 10:41 AM
L56	32	L48 AND (socket AND tongue AND reversible)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:46 AM

L57	317	L48 AND (socket AND tongue AND ((two OR multiple OR plural) WITH plug\$1))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:49 AM
L58	208	L57 NOT L54	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:49 AM
L59	4	WO-2009069969-\$.did.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 11:04 AM
L60	4	"7160125".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 11:06 AM
L61	3	"20060024997".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 11:35 AM
L62	3	L2 OR L3	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 01:20 PM
L63	3	L62 AND height	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 01:20 PM
L64	3	L62 AND simultaneously	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 01:34 PM
L65	11	((US-8198563-B2 OR US-7361059-B2 OR US-6981887-B1 OR US-RE49287-E OR US-7160125-B1).did. AND USPT.dbnm.) OR ((US-20090156055-A1 OR US-20060024997-A1 OR US-20100221936-A1).did. AND PGPB.dbnm.) OR ((WO-2009069969-A2).did. AND EPAB.dbnm.) OR ((US-7160125-B1 OR US-20060024997-A1).did. AND DWPI.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/01 01:51 PM
L66	5	L65 AND metal\$3	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/01 01:51 PM
L67	3	L62 AND metal	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR,	OR	ON	ON	2024/07/01 01:52 PM

L68	3	"7361059".pn.	GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 02:01 PM
L69	1937176	@pd>"20240701"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/10/23 10:18 AM
L70	719	L69 AND (L36 OR L38 OR L39 OR L40 OR L41 OR L42 OR L45 OR L44 OR L43 OR L46 OR L47)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/10/23 10:21 AM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Chou Hsien Tsai)
Application No.: 17/974,866 (**Reissue** of USPN 8,198,563))
Filed: Herewith)
Atty. File No.: 123151.0001.1_KIWI-1REIC)

Group Art Unit: 3993
Examiner: WILLIAM E DONDERO
Confirmation No.: 1048

For: SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

REQUEST FOR CORRECTED FILING RECEIPT

Dear Commissioner:

This is a Request for a Corrected Filing Receipt in the above-referenced patent application:

In the section entitled “**Applicant(s)**”, the correction should read as follows:

~~KIWI CONNECTION, LLC, Waco, TX~~ KIWI INTELLECTUAL ASSETS CORPORATION, New Taipei City, TW, Assignee (with 1.172 Interest);

The Corrected Application Data Sheet submitted August 6, 2024 contains the updated the Applicant information.

Applicants believe that no fees are due for requesting this correction. However, the Commissioner is hereby authorized to charge any underpayment, or credit any overpayment, to Deposit Account No. 09-0528, in connection with this request.

Respectfully submitted,

WOMBLE BOND DICKINSON (US) LLP

Date: October 21, 2024

By: /Jason H. Vick/

Jason H. Vick

Reg. No. 45,285

1899 Wynkoop Street, Suite 750

Denver, CO 80202

Telephone: 720-983-1336

jason.vick@wbd-us.com

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Chou Hsien Tsai)
Application No.: 17/974,866 (**Reissue** of USPN 8,198,563))
Filed: Herewith)
Atty. File No.: 123151.0001.1_KIWI-1REIC)
Group Art Unit: 3993
Examiner: WILLIAM E DONDERO
Confirmation No.: 1048
For: SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

AMENDMENT AND RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Applicant submits this Amendment and Response to address the Office Action having a mailing date of July 30, 2024. Please credit any overpayment or charge any underpayment to Deposit Account No. 09-0528.

Please amend the above-identified patent application as follows:

Amendments to the Specification begin on page **2** of this paper.

Amendments to the Claims are shown in the listing of claims which begins on page **3** of this paper.

Remarks begin on page **43** of this paper.

Amendments to the Specification:

On col. 6, starting at line 22 of U.S. Patent 8,198,563, please amend the specification as follows:

In a front view, the one row of connection terminals 11 have the serial numbers of 4, 3, 2, 1 from left to right (i.e., a functional reverse mirror configuration). When the connection terminals 11 of the USB 2.0 plug 10 face the second surface 502 of the tongue 50 and are normally inserted into the connection slot 45, its chamber is fitted with the tongue 50, and its one row of connection terminals 11 are turned into the serial numbers of 1, 2, 3, 4 from left to right, and are electrically connected to the second contact 71 of the one row of second terminals 70 on the bottom of the tongue 50 (the serial numbers are 1, 2, 3, 4 from left to right).

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Cancel claims 1. - 34.

35. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface with grooves, and a second surface with grooves, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect via the first and second contacts;

the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states;

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

36. (New) The socket structure of claim 35, wherein the tongue only contacts an interior portion of the plug when the plug is inserted.

37. (New) The socket structure of claim 36, wherein a thickness of the tongue is less than a third of a height of the connection slot.

38. (New) The socket structure of claim 35, wherein a portion of each of the first contacts, in the at least one row of first contacts, is coplanar with a portion of the first surface of the tongue.

39. (New) The socket structure of claim 38, wherein a portion of each of the second contacts, in the at least one row of second contacts, is coplanar with a portion of the second surface of the tongue.

40. (New) The socket structure of claim 35, further comprising a metal housing at least partially covering the plastic base.

41. (New) The socket structure of claim 35, wherein the socket structure is a universal serial bus socket structure.

42. (New) The socket structure of claim 35, wherein the tongue and the plastic base are integrally formed.

43. (New) The socket structure of claim 35, wherein each contact of the first and second contacts is a portion of a respective terminal.

44. (New) The socket structure of claim 35, wherein each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover.

45. (New) The socket structure of claim 35, wherein at least two of the first contacts are not in electrical communication with one another, and at least two of the second contacts are not in electrical communication with one another.

46. (New) The socket structure of claim 35, further comprising a rear cover attached to the plastic base.

47. (New) The socket structure of claim 46, wherein each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through the rear cover.

48. (New) The socket structure of claim 46, wherein each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover.

49. (New) The socket structure of claim 35, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.

50. (New) The socket structure of claim 35, wherein at least two of the first contacts are not in electrical communication with one another.

51. (New) The socket structure of claim 35, wherein at least two of the second contacts are not in electrical communication with one another.

52. (New) The socket structure of claim 35, wherein the at least one row of first contacts and respective first pins are located at ends of respective ones of a row of first terminals and the at least one row of second contacts and respective second pins are located at ends of respective ones of a row of second terminals.

53. (New) The socket structure of claim 35, wherein a portion of a first contact projects beyond one surface of the tongue, and a portion of a second contact projects beyond another surface of the tongue.

54. (New) The socket structure of claim 35, wherein a portion of one of the first contacts is at least partially included in the first surface with grooves.

55. (New) The socket structure of claim 35, wherein a portion of one of the second contacts is at least partially included in the second surface with grooves.

56. (New) An electrical connection system comprising the socket structure with the duplex electrical connection of claim 35 and the plug.

57. (New) A socket structure with duplex electrical connection, the socket structure comprising:
a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;

the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts.

58. (New) An electrical connection system comprising the socket structure with the duplex electrical connection of claim 57 and the plug, wherein the socket structure is operatively

connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.

59. (New) The socket structure of claim 57, wherein the tongue and the plastic base are integrally formed.

60. (New) The socket structure of claim 59, further comprising a metal housing at least partially covering the plastic base.

61. (New) The socket structure of claim 60, wherein at least two of the first contacts are not in electrical communication with one another and at least two of the second contacts are not in electrical communication with one another.

62. (New) The socket structure of claim 61, wherein the grooves in the first surface of the tongue each include a portion of one of the first contacts, and the grooves in the second surface of the tongue each include a portion of one of the second contacts.

63. (New) The socket structure of claim 62, wherein the at least one row of first contacts includes at least five contacts, and the at least one row of second contacts includes at least five contacts.

64. (New) The socket structure of claim 63, wherein the tongue has chamfered corners on two sides of the tongue.

65. (New) The socket structure of claim 64, wherein a tip of the tongue is tapered.

66. (New) The socket structure of claim 65, wherein a thickness of the tongue is less than third of a height of the connection slot.

67. (New) The socket structure of claim 66, wherein the socket structure is a universal serial bus socket structure.

68. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface with grooves, and a second surface with grooves, disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the at least one row of first contacts includes at least six contacts,

the at least one row of second contacts includes at least six contacts,

the socket structure is operative to simultaneously electrically connect via the first and second contacts;

the at least one row of first contacts has a reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

69. (New) An electrical connection system comprising the socket structure with the duplex electrical connection of claim 68 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.

70. (New) The socket structure of claim 68, wherein the tongue and the plastic base are integrally formed.

71. (New) The socket structure of claim 70, further comprising a metal housing at least partially covering the plastic base.

72. (New) The socket structure of claim 71, wherein at least two of the first contacts are not in electrical communication with one another and at least two of the second contacts are not in electrical communication with one another.

73. (New) The socket structure of claim 72, wherein the grooves in the first surface of the tongue each include a portion of one of the first contacts, and the grooves in the second surface of the tongue each include a portion of one of the second contacts.

74. (New) The socket structure of claim 73, wherein the tongue has chamfered corners on two sides of the tongue.

75. (New) The socket structure of claim 74, wherein a portion of the tongue opposite the plastic base is tapered.

76. (New) The socket structure of claim 75, wherein a thickness of the tongue is less than third of a height of the connection slot.

77. (New) The socket structure of claim 76, wherein the socket structure is a universal serial bus socket structure.

78. (New) The socket structure of claim 77, wherein each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through the rear cover, and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover.

79. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base having a metal housing;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface with grooves, and a second surface with grooves, disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the at least one row of first contacts includes at least four contacts,

the at least one row of second contacts includes at least four contacts,

the socket structure is operative to simultaneously electrically connect via the first and the second contacts;

the at least one row of first contacts has a reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

80. (New) An electrical connection system comprising the socket structure with the duplex electrical connection of claim 79 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.

81. (New) The socket structure of claim 79, wherein the tongue and the plastic base are integrally formed.

82. (New) The socket structure of claim 81, wherein the metal housing at least partially covers the plastic base.

83. (New) The socket structure of claim 82, wherein at least two of the first contacts are not in electrical communication with one another and at least two of the second contacts are not in electrical communication with one another.

84. (New) The socket structure of claim 83, wherein the grooves in the first surface of the tongue each include a portion of one of the first contacts, and the grooves in the second surface of the tongue each include a portion of one of the second contacts.

85. (New) The socket structure of claim 84, wherein the tongue has chamfered corners on two sides of the tongue.

86. (New) The socket structure of claim 85, wherein a portion of the tongue opposite the plastic base is tapered.

87. (New) The socket structure of claim 86, wherein a thickness of the tongue is less than third of a height of the connection slot.

88. (New) The socket structure of claim 87, wherein the socket structure is a universal serial bus socket structure and each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through the rear cover, and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover.

89. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface with grooves, and a second surface with grooves, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two

sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue,
wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the at least one row of first contacts includes more than four contacts,

the at least one row of second contacts includes more than four contacts,

the socket structure is operative to simultaneously electrically connect via the first and second contacts;

the at least one row of first contacts has a reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

90. (New) An electrical connection system comprising the socket structure with the duplex electrical connection of claim 89 and the plug, wherein the socket structure is operatively

connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.

91. (New) The socket structure of claim 89, wherein the tongue and the plastic base are integrally formed.

92. (New) The socket structure of claim 91, wherein the metal housing at least partially covers the plastic base.

93. (New) The socket structure of claim 92, wherein at least two of the first contacts are not in electrical communication with one another and at least two of the second contacts are not in electrical communication with one another.

94. (New) The socket structure of claim 93, wherein the grooves in the first surface of the tongue each include a portion of one of the first contacts, and the grooves in the second surface of the tongue each include a portion of one of the second contacts.

95. (New) The socket structure of claim 94, wherein the tongue has chamfered corners on two sides of the tongue.

96. (New) The socket structure of claim 95, wherein a portion of the tongue opposite the plastic base is tapered.

97. (New) The socket structure of claim 96, wherein a thickness of the tongue is less than third of a height of the connection slot.

98. (New) The socket structure of claim 97, wherein:
the socket structure is a universal serial bus socket structure and each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through the rear cover, and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover,

the tongue only contacts an interior portion of the plug when the plug is inserted,
each contact of the first and second contacts is a portion of a respective terminal,
a portion of a first contact projects beyond one surface of the tongue, and a portion of a
second contact projects beyond another surface of the tongue,

the grooves in the first surface of the tongue each include a portion of one of the first
contacts, and

the grooves in the second surface of the tongue each include a portion of one of the
second contacts.

99. (New) A socket structure with duplex electrical connection, the socket structure
comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be
connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface with grooves, and a second surface with grooves, the
second surface disposed opposite the first surface, the tongue being disposed on one end of the
plastic base and within the connection slot, such that chambers of the connection slot on two
sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the
connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue,
wherein each of the first contacts is electrically connected to a respective first pin extending out
of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the
tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending
out of the plastic base;

the socket structure is operative to simultaneously electrically connect via the first and
second contacts;

the at least one row of first contacts has a functional reverse mirror configuration relative
to the at least one row of second contacts, and the socket structure is thereby configured for two
separate operational states;

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

100. (New) An electrical connection system comprising the socket structure with the duplex electrical connection of claim 99 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.

101. (New) The socket structure of claim 99, wherein the tongue and the plastic base are integrally formed.

102. (New) The socket structure of claim 101, wherein the metal housing at least partially covers the plastic base.

103. (New) The socket structure of claim 102, wherein at least two of the first contacts are not in electrical communication with one another and at least two of the second contacts are not in electrical communication with one another.

104. (New) The socket structure of claim 103, wherein the grooves in the first surface of the tongue each include a portion of one of the first contacts, and the grooves in the second surface of the tongue each include a portion of one of the second contacts.

105. (New) The socket structure of claim 104, wherein the tongue has chamfered corners on two sides of the tongue.

106. (New) The socket structure of claim 105, wherein a portion of the tongue opposite the plastic base is tapered.

107. (New) The socket structure of claim 106, wherein a thickness of the tongue is less than third of a height of the connection slot.

108. (New) The socket structure of claim 107, wherein:
the socket structure is a universal serial bus socket structure and each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through the rear cover, and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover,

the tongue only contacts an interior portion of the plug when the plug is inserted,
each contact of the first and second contacts is a portion of a respective terminal,
a portion of a first contact projects beyond one surface of the tongue, and a portion of a second contact projects beyond another surface of the tongue,

the grooves in the first surface of the tongue each include a portion of one of the first contacts, and

the grooves in the second surface of the tongue each include a portion of one of the second contacts.

109. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a metal housing at least partially covering the plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface with grooves, and a second surface with grooves, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect via the first and second contacts;

the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue,

the socket structure is a universal serial bus socket structure and each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear

cover, and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover,

the tongue only contacts an interior portion of the plug when the plug is inserted,

each contact of the first and second contacts is connected to a respective portion of a respective terminal,

the grooves in the first surface of the tongue each include a at least a portion of respective ones of the first contacts, and

the grooves in the second surface of the tongue each include at least a portion of respective ones of the second contacts.

110. (New) An electrical connection socket and plug comprising the socket structure of claim 109 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.

111. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a metal housing at least partially covering the plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first surface with grooves, and a bottom side with a second surface with grooves, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;

the at least one row of first contacts has a reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue,

the socket structure is a universal serial bus socket structure and each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover, and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover,

the tongue only contacts an interior portion of the plug when the plug is inserted,
each contact of the first and second contacts is a portion of a respective terminal,
the grooves in the first surface of the tongue each include a respective portion of
respective ones of the first contacts,

the grooves in the second surface of the tongue each include a portion of respective ones of the second contacts,

a portion of the tongue opposite the plastic base is tapered, and
the tongue has chamfered edges on two opposite sides of the tongue.

112. (New) An electrical connection socket and plug comprising the socket structure of claim 111 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.

113. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a metal housing at least partially covering the plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;

the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue,

the socket structure is a universal serial bus socket structure and each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover, and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover,

the tongue only contacts an interior portion of the plug when the plug is inserted,
each contact of the first and second contacts is connected to a portion of a respective terminal,

the grooves in the first surface of the tongue each include at least a portion of respective ones of the first contacts,

the grooves in the second surface of the tongue each include at least a portion of respective ones of the second contacts,

a portion of the tongue opposite the plastic base is tapered,

a thickness of the tongue, in at least one portion, is less than third of a height of the connection slot, and

the tongue has chamfered edges on two opposite sides of the tongue.

114. (New) An electrical connection socket and plug comprising the socket structure of claim 113 and the plug, wherein the socket structure is operatively connected to the plug, and wherein the socket structure is operative to simultaneously electrically connect via the first and second contacts.

115. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface and a second surface disposed opposite the first surface and is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect via the first and second contacts;

the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is centrally located within the connection slot,

wherein the connection slot is symmetric with up, down, left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

116. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first castellated surface and bottom side with a second castellated surface disposed opposite the first castellated surface and is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first castellated surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second castellated surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base,

the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and

the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second castellated surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with up, down, left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first castellated surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

117. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface and a second surface disposed opposite the first surface and is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base, wherein a first portion of each of the first contacts is proud of a top-most surface of the tongue; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein a second portion of each of the second contacts is proud of a bottom-most surface of the tongue, and

the socket structure is operative to simultaneously electrically connect on both sides of the tongue via the first and second contacts, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base; and

the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed at a middle within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

118. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first surface and bottom side with a second surface disposed opposite the first surface, and the tongue is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and

the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is centrally located within the connection, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

119. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first surface and a bottom side with a second surface disposed opposite the first surface, and the tongue is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts;

the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and

the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

120. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side a first surface and a bottom side with a second surface disposed opposite the first surface, and the tongue is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a second pin extending out of the plastic base;

the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and

the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed at a middle within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

121. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first surface and a bottom side with a second surface disposed opposite the first surface, and the tongue is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot based on an operational state when the socket structure is connected to the plug;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a second pin extending out of the plastic base;

the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and

the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is centrally located within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

122. (New) A socket structure configured for a duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface and a second surface disposed opposite the first surface, and is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot,

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the at least one row of first contacts have increasing assigned serial numbers in a first direction and the at least second row of second contacts have decreasing assigned serial numbers in the first direction;

when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts, and the tongue is disposed at central location within the connection slot so that the connection slot is formed with up and down chambers, and left and right chambers around the tongue with the up and down chambers being symmetrical, and the left and right chambers being symmetrical; and

when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at the middle within the connection slot so that the connection slot is formed with symmetric profiles in up, down, left and right chambers around

the tongue with the up and down chambers being symmetrical, and the left and right chambers being symmetrical; and

the tongue operative for signal transmission on one side when connected in a first configuration, and operative for signal transmission simultaneously on both sides when connected in a second configuration.

123. The socket structure of claim 122, wherein the first and the second surfaces of the tongue are castellated, and wherein the first contacts are at least partially on a grooved portion of the first surface such that at least a portion of the first contacts are proud of the first surface, and the second contacts are at least partially on a grooved portion of the second surface such that at least a portion of the second contacts are proud of the second surface.

124. (New) The socket structure of claim 122, wherein a thickness of the tongue is less than third of a height of the connection slot.

125. (New) A socket structure configured for a duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface and a second surface disposed opposite the first surface, and is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot,

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the at least one row of first contacts have increasing assigned serial numbers in a first direction and the at least second row of second contacts have decreasing assigned serial numbers in the first direction;

when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts, and the tongue is disposed at central location within the connection slot so that the connection slot is formed with up and down chambers, and left and right chambers around the tongue with the up and down chambers being symmetrical, and the left and right chambers being symmetrical; and

when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at the middle within the connection slot so that the connection slot is formed with symmetric profiles in up, down, left and right chambers around the tongue with the up and down chambers being symmetrical, and the left and right chambers being symmetrical; and

the tongue is operative for signal transmission on one side when connected in a first configuration, and operative for signal transmission simultaneously on both sides when connected in a second configuration; and

the socket structure is further operative to receive one of two different types of universal serial bus plugs.

126. (New) The socket structure of claim 125, wherein the first and the second surfaces of the tongue are castellated, and wherein the first contacts are at least partially placed in grooves of the first surface such that at least a portion of the first contacts are proud of the first surface, and the second contacts are at least partially placed in grooves of the second surface such that at least a portion of the second contacts are proud of the second surface.

127. (New) The socket structure of claim 125, wherein a thickness of the tongue is less than third of a height of the connection slot.

128. (New) A socket structure configured for a duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface and a second surface disposed opposite the first surface, and is disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot,

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the at least one row of first contacts have increasing assigned serial numbers in a first direction and the at least second row of second contacts have decreasing assigned serial numbers in the first direction;

when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts, and the tongue is disposed at central location within the connection slot so that the connection slot is formed with up and down chambers, and left and right chambers around the tongue with the up and down chambers being symmetrical, and the left and right chambers being symmetrical; and

when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed at the middle within the connection slot so that the

connection slot is formed with symmetric profiles in up, down, left and right chambers around the tongue with the up and down chambers being symmetrical, and the left and right chambers being symmetrical; and

the tongue is operative for signal transmission on one side when connected in a first configuration, and operative for signal transmission simultaneously on both sides when connected in a second configuration; and

the socket structure is further operative to receive one of two different styles of universal serial bus plugs.

129. (New) The socket structure of claim 128, wherein the first and the second surfaces of the tongue are castellated, and wherein the first contacts are at least partially placed in grooves of the first surface such that at least a portion of the first contacts are proud of the first surface, and the second contacts are at least partially placed in grooves of the second surface such that at least a portion of the second contacts are proud of the second surface.

130. (New) The socket structure of claim 128, wherein a thickness of the tongue is less than third of a height of the connection slot.

131. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface with recesses, and a second surface with recesses, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect via the first and second contacts;

the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for two separate operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

132. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers

of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;

the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured such that:

when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts; and

when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts.

133. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers

of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;

the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts, and the socket structure is thereby configured for reversible connection such that:

when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts; and

when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts.

134. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a first surface with recesses, and a second surface with recesses, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two

sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect via the first and second contacts;

some of the at least one row of first contacts has a functional reverse mirror configuration relative to some of the at least one row of second contacts, and the socket structure is thereby configured for two operational states:

a first operational state when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; and

a second operational state when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts, and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue.

135. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;

at least some of the at least one row of first contacts has a functional reverse mirror configuration relative to at least some of the at least one row of second contacts, and the socket structure is thereby configured such that:

when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts; and

when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts.

136. (New) A socket structure with duplex electrical connection, the socket structure comprising:

a plastic base;

a connection slot, which is disposed in front of the plastic base and configured to be connected to a plug having at least one row of connection terminals;

a tongue, which has a top side with a first surface with grooves, and bottom side with a second surface with grooves, the second surface disposed opposite the first surface, the tongue being disposed on one end of the plastic base and within the connection slot, such that chambers of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot;

at least one row of first contacts separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base;

the socket structure is operative to simultaneously electrically connect on the top and the bottom side of the tongue;

a portion of the at least one row of first contacts has a reverse mirror configuration relative to a portion of the at least one row of second contacts, and the socket structure is thereby configured for reversable connection such that:

when the plug is normally inserted into the connection slot with the at least one row of connection terminals of the plug facing the second surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of second contacts; and

when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals of the plug facing the first surface of the tongue, the at least one row of connection terminals of the plug are electrically connected to the at least one row of first contacts.

REMARKS

Applicant respectfully requests reconsideration of this application, as amended.

By the above amendments, the objection to the Specification has been addressed in accordance with the recommendation made by the Examiners during the 25 September 2024 Interview. Withdrawal of the objection is respectfully requested.

Attached hereto is a new consent of Assignee.

Regarding the objection to the Declaration, and in accordance with the Examiners' recommendation, presented below is a proposed error statement. Should the Examiner find this new error statement to be acceptable, a new Declaration will be executed and promptly submitted.

At least one error upon which the subject reissue is based is that the patentee claimed more or less than they had the right to claim in the patent, and have therefore included at least the narrowing feature in claim 68 that “...the at least one row of first contacts includes at least six contacts, the at least one row of second contacts includes at least six contacts, the socket structure is operative to simultaneously electrically connect via the first and second contacts...” The originally patented claims fail to claim at least this specific combination of features.

Regarding the 35 U.S.C. §112 rejection, and by the above amendments, the claims have been amended to recite “chamfered” rather than “rounded” as recommended by the Examiners.

Additionally, and with reference to at least Figures 2A, 4A, 5A, 19, and 21, the tongue can be seen as occupying less than 1/3 of the connection slot. This is particularly evident in Figs. 19 and 21 where the plugs 20 in Fig. 19, and plugs 25 in Fig. 21, each occupy approximately 40% of the connection slot. Thus, the tongue would be approximately 20% of the height of the connection slot and provide support for the claimed feature.

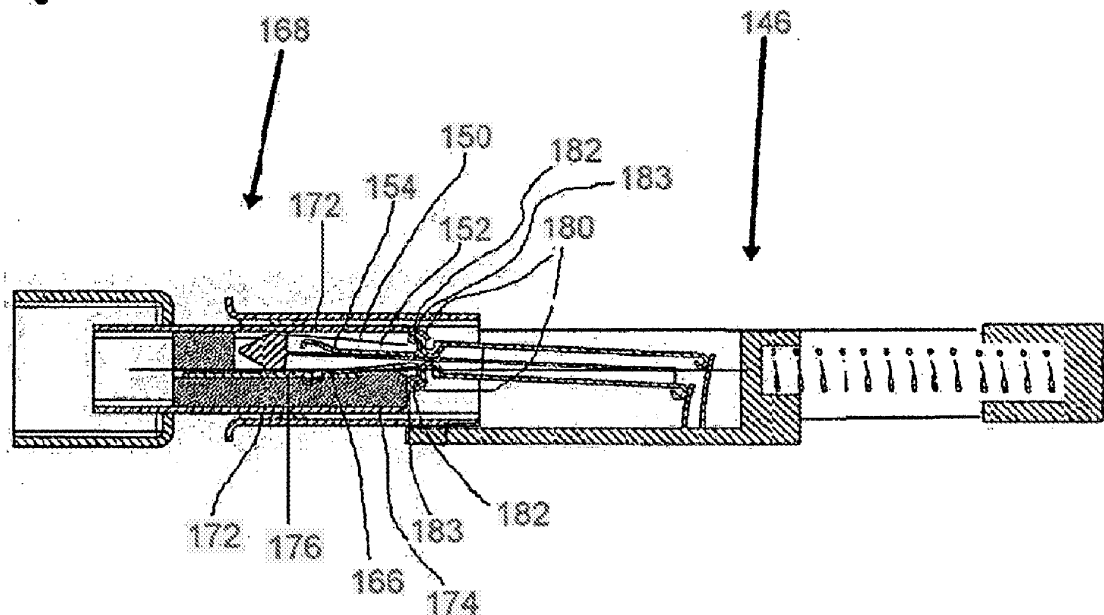
As such, withdrawal of the rejection is respectfully requested.

Claims 35-136 are rejected in view of Teicher and Lee, with this rejection being respectfully traversed.

As discussed during the Interview, in Teicher, as shown in Fig. 5e, the tongue arrangement 150 is configured to move up and down such that when block 174 is inserted into

the socket, the tongue arrangement 150 deflects upward to block the upper portion of the plug from being inserted. Thus, Teicher is incapable of operating, and at least fails to disclose, at least the claimed feature of *socket structure being operative to simultaneously electrically connect via the first and second contacts*.

Fig. 5e

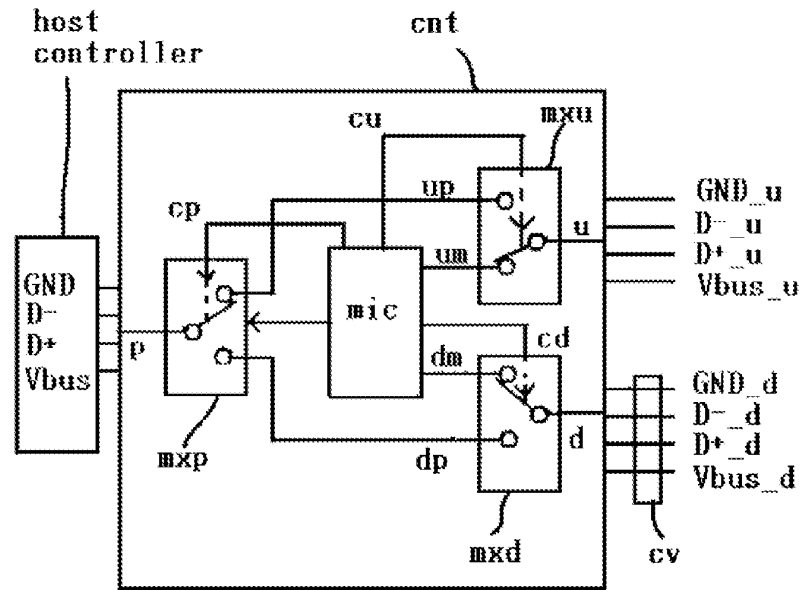


Lee also at least fails to teach, suggest or disclose this claimed feature.

Specifically, in Lee, as shown in Fig. 6 below, the multiplexers (mxu, mxd, mxp) operate such that *only* the upper *or* the lower set of contacts are connected to the host controller. (Note the position of the switch in mxp, in particular, which either selects the upper *or* the lower set of contacts.

Lee does not disclose at least the claimed feature of the *socket structure being operative to simultaneously electrically connect via the first and second contacts* as claimed.

[Fig. 6]



Relatedly, claims 116 and 118-121 are also distinguishable from the references.

For example, claim 116 states, in part:

...at least one row of first contacts separately arranged on the first castellated surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base; and

at least one row of second contacts separately arranged on the second castellated surface of the tongue, wherein:

each of the second contacts is electrically connected to a respective second pin extending out of the plastic base,

the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; and

the socket structure is thereby configured for two separate operational states...

Neither Teicher or Lee teach, suggest or disclose this combination of features.

As such, claims 116 and 118-121 are also distinguishable from the references.

With the claimed combination of features not being shown in either reference, withdrawal of the rejection is respectfully requested.

The dependent claims are further distinguishable at least based on the above and the additional feature(s) recited therein.

Attached hereto is an eTerminal Disclaimer addressing the double patenting rejection.

Withdrawal of the rejection is respectfully requested.

With all objections and rejections having been overcome, Applicant respectfully submits the application is in condition for allowance.

A Notice of Allowance is respectfully solicited.

Should the Examiner believe anything further is desirable in order to place the application in an even better condition for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the telephone number or email address listed below.

The Commissioner is hereby authorized to charge to deposit account number 09-0528 any fees under 37 CFR § 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and has not been separately requested, such extension is hereby Petitioned.

Respectfully submitted,

WOMBLE BOND DICKINSON (US) LLP

Date: October 21, 2024

By: /Jason H. Vick/

Jason H. Vick

Reg. No. 45,285

1899 Wynkoop Street, Suite 750

Denver, CO 80202

Telephone: 720-983-1336

jason.vick@wbd-us.com



ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #

17/974,866

RECEIPT DATE / TIME

10/21/2024 04:41:27 PM Z ET

ATTORNEY DOCKET #

123151.0001.1_KIWI-1REIC

Title of Invention

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

Application Information

APPLICATION TYPE Utility - Reissue

PATENT # -

CONFIRMATION # 1048

FILED BY Joanne Vos

PATENT CENTER # 67656161

FILING DATE 10/27/2022

CUSTOMER # 62574

FIRST NAMED INVENTOR Chou Hsien Tsai

CORRESPONDENCE ADDRESS -

AUTHORIZED BY Jason Vick

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
AMEND_01_KIWI_1-CON-REI-CON.pdf	46	-	493 KB
AMEND_01_KIWI_1-CON-REI-CON-A....pdf (1-1)	1	Amendment/Request for Reconsideration-After Non-Final Rejection	77 KB
AMEND_01_KIWI_1-CON-REI-CON-SPEC.pdf (2-2)	1	Specification	77 KB
AMEND_01_KIWI_1-CON-REI-CON-CLM.pdf (3-42)	40	Claims	163 KB
AMEND_01_KIWI_1-CON-REI-CON-REM.pdf (43-46)	4	Applicant Arguments/Remarks Made in an Amendment	400 KB
Executed_Consent_of_Assig-nee_KIWI_1-REI-CON.pdf	1	Consent of Assignee accompanying the declaration	1057 KB

Request_for_Corrected_Filing_Receipt_KIWI_1-REI-CON.pdf

2

Request for Corrected Filing Receipt

80 KB

Digest

DOCUMENT

MESSAGE DIGEST(SHA-512)

AMEND_01_KIWI_1-CON-REI-CON.pdf

EF35912426E2DF3587474899B7A4E0F7AA8E87E4E5BBA17AF
FAF83E90FF9BAB7955B9BDD8F9357D22F7FBC89053912B016
8FEDD8B9307C9C23CC0C7F4B5050A1

AMEND_01_KIWI_1-CON-REI-CON-A....pdf

EC2F6828315D93194EC6D08C2DB90298155B6B3615F1FE571
7C7B282B74AD3021996D3FA5E2A1B7A4C566E9BBADAE909E
C515975CCB89E112B5BC41E84B79399

AMEND_01_KIWI_1-CON-REI-CON-SPEC.pdf

01FBFEF1114E2764EDF07E20770C3D8FD576488637A323378
DA0DB935790AC6EEC5B3D21EA495D27223079C4DD384BC18
0A9B7662B1CFD2AD6873A2E5CA0D7F0

AMEND_01_KIWI_1-CON-REI-CON-CLM.pdf

C77FB1DF10AE2891E152EED4F74CD9513C0868F952A7F4B2
A396224391F7A058109B97FA070D5A465D04E1C9399315042B
AFB695932D9DD218F34789DE5ECA79

AMEND_01_KIWI_1-CON-REI-CON-REM.pdf

31CB2CD3D85D82A3154B25F76D86FDD3821841E83FD900E1
D1AE829F7A5C1FDD2E3CDE38A520F0E50F8F50B9F44F17EB
3A518B3BB3E18963755E197DAA4023DD

Executed_Consent_of_Assignee_KIWI_1-REI-CON.pdf

84B4E7D45BA9564B2D9DD00156C963ABC400C2798AC3D401
BA4776BF27BA05F4DE4A69DD0E7CCFE43CED5563B1CDDD0
D70137C6F084A4FE0E5DB9C7E1E124B1A

Request_for_Corrected_Filing_Receipt_KIWI_1-REI-CON.pdf

8F5964958729448B49B7CA961D7286F86E93A6C606204B7EAA
894C9CCAADB3772252125B1CB48A3AA81FF38156D141C2A1
F55351A803F62F907131642FDE9B4F

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an

international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

REISSUE APPLICATION: CONSENT OF ASSIGNEE; STATEMENT OF NON-ASSIGNMENT	Docket Number (Optional) 123151.0001.1_KIWI-1REIC
This is part of the application for a reissue patent based on the original patent identified below.	
Name of Patentee(s) KIWI INTELLECTUAL ASSETS CORPORATION	
Patent Number 8,198,563	Date Patent Issued June 12, 2012
Title of Invention SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION	
<p>1. ☒ Filed herein is a statement under 37 CFR 3.73(c). (Form PTO/AIA/96)</p> <p>2. ☐ Ownership of the patent is in the inventor(s), and no assignment of the patent is in effect.</p> <p>One of boxes 1 or 2 above must be checked. If multiple assignees, complete this form for each assignee. If box 2 is checked, skip the next entry and go directly to "Name of Assignee."</p> <p>The written consent of all assignees and inventors owning an undivided interest in the original patent is included in this application for reissue.</p>	
The assignee(s) owning an undivided interest in said original patent is/are KIWI INTELLECTUAL ASSETS CORPORATION	
and the assignee(s) consents to the accompanying application for reissue.	
Name of assignee (if assigned)/inventor (if not assigned)	
Signature TSAI, CHOU HSIEN	Date 08. OCT. 2024
Typed or printed name and title of person signing for assignee (if assigned) Chou Hsien Tsai, Chairman, KIWI INTELLECTUAL ASSETS CORPORATION	

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0033. Public burden for this form is estimated to average 6 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email informationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. If filing this completed form by mail, send to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #
17/974,866

RECEIPT DATE / TIME
10/21/2024 04:34:17 PM Z ET

ATTORNEY DOCKET #
123151.0001.1_KIWI-1REIC

Title of Invention

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

Application Information

APPLICATION TYPE Utility - Reissue

PATENT # -

CONFIRMATION # 1048

FILED BY Jason Vick

PATENT CENTER # 67655954

AUTHORIZED BY -

CUSTOMER # 62574

FILING DATE 10/27/2022

CORRESPONDENCE
ADDRESS -

FIRST NAMED
INVENTOR Chou Hsien Tsai

Payment Information

PAYMENT METHOD
DA / 090528

PAYMENT TRANSACTION ID
E20240KG34407932

PAYMENT AUTHORIZED BY
Jason Vick

PRE-AUTHORIZED ACCOUNT
090528

PRE-AUTHORIZED CATEGORY
37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE(\$)	QUANTITY	ITEM TOTAL(\$)
2814	STATUTORY DISCLAIMER, INCLUDING TERMINAL DISCLAIMER	170.00	1	170.00
TOTAL AMOUNT:				\$170.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement

Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT

APPLICATION #	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET #
17974866	10/27/2022	Chou Hsien Tsai	123151.0001.1_KIWI-1REIC

Title of Invention

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION



Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action



This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent interest
KIWI INTELLECTUAL ASSETS CORPORATION	100%
Total	100%

The owner(s) of percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending reference Application Number(s)

Application #	Filing Date
---------------	-------------

as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the reference application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term of any patent granted on said reference application, "as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application," in the event that any such patent granted on the pending reference application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

The owner(s) of percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

Patent #

RE49287

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:

- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.



Terminal disclaimer fee under 37 CFR 1.20(d) included with Electronic Terminal Disclaimer request.

Applicant claims the following entity status:

Small

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I certify, in accordance with 37 CFR 1.4(d)(4) that I am: An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Signature

Name

Registration #

/Jason H Vick/

Jason Vick

45285

* Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner). Form PTO/SB/96 may be used for making this certification. See MPEP 324.



UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
17/974,866	10/21/2024 04:34:17 PM Z ET	123151.0001.1_KIWI-1REIC

Title of Invention

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

Application Information

APPLICATION TYPE	Utility - Reissue	PATENT #	-
CONFIRMATION #	1048	FILED BY	Jason Vick
PATENT CENTER #	67655954	FILING DATE	10/27/2022
CUSTOMER #	62574	FIRST NAMED INVENTOR	Chou Hsien Tsai
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
petition-request.pdf	3	Terminal Disclaimer-Filed (Electronic)	44 KB
grantLetter.pdf	1	Terminal Disclaimer-Electronic-Approved	18 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
petition-request.pdf	00FE88D2F02DB7DAF6E751A1293ED12885F6CBC0316B77CF A6428132FFCD07FCD47519C8C5C082FB40C52BB6DCDBBA7 8D617E6F15DA1D379B3C1B6C9FB22EF15
grantLetter.pdf	36B408D8F7623AD920F4BE03AE85AF2B43472FF6E3F7627EF 48A9797D32C072E315E06E9C232AE2E37D90670CF5459BCE7

1918484BC87943F4C8C343FDE40196

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES
PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

APPROVAL LETTER

APPLICATION #
17/974,866

FILING DATE
10/27/2022

APPLICANT/PATENT UNDER REEXAMINATION
Chou Hsien Tsai

Title of Invention

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

Electronic terminal disclaimer filed on 10/21/2024



Approved

This patent is subject to a Terminal Disclaimer

Approved / Disapproved by: Electronic Terminal Disclaimer automatically approved

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 17/974,866		Filing Date 10/27/2022		☐ To be Mailed				
ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO												
APPLICATION AS FILED - PART I												
		(Column 1)		(Column 2)								
FOR		NUMBER FILED		NUMBER EXTRA		RATE (\$)		FEE (\$)				
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A		N/A		N/A						
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A		N/A		N/A						
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A		N/A		N/A						
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 = *				x \$50 =						
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *				x \$240 =						
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).										
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))												
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL						
APPLICATION AS AMENDED - PART II												
		(Column 1)		(Column 2)		(Column 3)						
AMENDMENT	10/21/2024	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 102	Minus	** 102	= 0			x \$40 =		0		
	Independent (37 CFR 1.16(h))	* 25	Minus	*** 25	= 0			x \$192 =		0		
	☐ Application Size Fee (37 CFR 1.16(s))											
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
								TOTAL ADD'L FEE		0		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	*	Minus	**	=			x \$0 =				
	Independent (37 CFR 1.16(h))	*	Minus	***	=			x \$0 =				
	☐ Application Size Fee (37 CFR 1.16(s))											
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
								TOTAL ADD'L FEE		LIE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.												
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".										/RHONDA BELL/		
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".												
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.												

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	10/27/2022	Chou Hsien Tsai	123151.0001.1_KIWI-IREIC	1048
62574	7590	09/30/2024		
Jason H. Vick WOMBLE BOND DICKINSON (US) LLP 2370 E. 160th PL Thornton, CO 80602			EXAMINER DONDERO, WILLIAM E	
			ART UNIT 3993	PAPER NUMBER
			NOTIFICATION DATE 09/30/2024	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jason.vick@wbd-us.com
joanne.vos@wbd-us.com

<i>Applicant-Initiated Interview Summary</i>	Application No. 17/974,866	Applicant(s) Tsai, Chou Hsien		
	Examiner WILLIAM E DONDERO	Art Unit 3993	AIA (First Inventor to File) Status No	Page 1 of 2

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
WILLIAM E DONDERO	Primary Examiner	Video Conference
Eileen D. Lillis	SPE	
William C. Doerrler	Primary Examiner	
Jason Vick	Attorney of Record	

Date of Interview: 25 September 2024

Issues Discussed:

35 U.S.C. 112

Applicant's representative pointed to Figure 53 to shown tongue with rounded ends. Examiner explained ends appeared to be chamfered rather than rounded. Applicant's representative agreed. Applicant's representative stated Figure 2 showed tongue thickness less than one third of socket opening. Examiner stated without the drawing being to scale, marking showing such, or text in the specification supporting such the limitation is not supported. Applicant's representative pointed to Figure 21 with the two plugs to support this relationship. Examiner suggested Applicant's representative make this argument in response and it would be considered.

35 U.S.C. 103

Applicant's representative discussed that Applicant's socket allows for plug to be inserted either way and two plugs to be inserted at the same time. Applicant's representative explained that Teicher allows the plug to be inserted either way but moves the tongue to block the opposite way once the plug is inserted. Applicant's representative explained that Lee allows for plug to be inserted either way, but due to the electrical circuitry only allows for one active plug at a time. Applicant's representative further explained combining Lee with Teicher is not possible due the deflection with the tongue. Examiner stated arguments appear to overcome the rejection of record but further search and consideration are need.

Objections

Discussed specification objection. Applicant's representative asked where to put function reverse mirror limitation in specification. Examiner stated where the specification discusses the numbers of the contacts on the top of the tongue being in opposite order of the numbers of the contacts of the bottom of the tongue.

Other

Applicant's representative discussed that a change of ownership had occurred and will submit new declaration and specification accordingly.

☒ Attachment

<i>Applicant-Initiated Interview Summary</i>	Application No. 17/974,866	Applicant(s) Tsai, Chou Hsien		
	Examiner WILLIAM E DONDERO	Art Unit 3993	AIA (First Inventor to File) Status No	Page 2 of 2

/WILLIAM E DONDERO/ Reexamination Specialist, Art Unit 3993	/WILLIAM C DOERRLER/ /Eileen Lillis/ Reexamination Specialist, AU 3993 SPRS, AU 3993
<p>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</p> <p>Please further see: MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing</p>	

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Dondero, William E.

From: Vick, Jason <Jason.Vick@wbd-us.com>
Sent: Friday, September 20, 2024 10:13 AM
To: Dondero, William E.
Subject: U.S. Appln. No.: 17/974,866 - Proposed Reissue Interview Agenda

CAUTION: This email has originated from a source outside of USPTO. **PLEASE CONSIDER THE SOURCE** before responding, clicking on links, or opening attachments.

Dear Ex. Dondero,

Thank you again for allowing us to schedule an Interview for next week.

During the Interview, we would at least like to discuss the following items:

1. Discuss objection to the Specification – Specifically, and since the Examiner is correct, Applicant would like to discuss how to amend the Specification to address the objection.
2. Discuss change of ownership and update to Consent of Assignee and Declarations
3. Discuss 112 rejection with reference to at least Figs. 53 and 2
4. Discuss overview and advantages of Applicant's technology
5. Provide summary of Teicher
6. Provide Summary of Lee
7. Discuss that neither Teicher nor Lee are capable of simultaneous electrical connection as claimed
8. Discuss operation of Lee and in particular Table 3 and exclusive states of operation and multiplexer operation with reference to Fig. 6
9. Discuss that Teicher could not be modified by Lee as proposed given the structural configuration of Teicher and the required deflection of the tongue (See at least Fig. 5e and [0143])

Thank you again and we look forward to speaking next week.

Jason Vick

Jason Vick

Registered Patent Attorney. Licensed in NY, District of Columbia, and the United States Patent and Trademark Office. Not licensed in other jurisdictions.

Partner
Womble Bond Dickinson (US) LLP

d: 720-983-1336

m: 703-624-8024

e: Jason.Vick@wbd-us.com





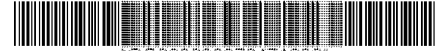
UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/974,866	10/27/2022	Chou Hsien Tsai	10186PAT-1-REI-CON

CONFIRMATION NO. 1048

POA ACCEPTANCE LETTER



0000000076471999

62574

Jason H. Vick

WOMBLE BOND DICKINSON (US) LLP

2370 E. 160th PL

Thornton, CO 80602

Date Mailed: 08/15/2024

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/06/2024.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/tawashington/



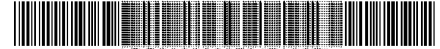
UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/974,866	10/27/2022	Chou Hsien Tsai	10186PAT-1-REI-CON

CONFIRMATION NO. 1048

POWER OF ATTORNEY NOTICE



0000000076471967

22442
Sheridan Ross PC
1560 Broadway
Suite 1200
Denver, CO 80202

Date Mailed: 08/15/2024

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/06/2024.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/tawashington/

STATEMENT UNDER 37 CFR 3.73(c)

First Named Inventor/Patent Owner: KIWI INTELLECTUAL ASSETS CORPORATION

Application No./Patent No.: 17/974,866 Filed/Issue Date: October 27, 2022

Titled: SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

KIWI INTELLECTUAL ASSETS CORPORATION, a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is ____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached*.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Chou Hsien Tsai To: KIWI INTELLECTUAL ASSETS CORPORATION

The document was recorded in the United States Patent and Trademark Office at
Reel 051885, Frame 0765, or for which a copy thereof is attached*.

2. From: KIWI INTELLECTUAL ASSETS CORPORATION To: KIWI CONNECTION, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 053711, Frame 0762, or for which a copy thereof is attached*.

[Page 1 of 2]

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 12 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email informationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

STATEMENT UNDER 37 CFR 3.73(c)3. From: KIWI CONNECTION, LLC To: KIWI INTELLECTUAL ASSETS CORPORATION

The document was recorded in the United States Patent and Trademark Office at

Reel 067400, Frame 0652, or for which a copy thereof is attached*.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached*.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached*.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached*.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).☒ *As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Jason H. Vick/August 6, 2024

Signature

Date

Jason H. Vick45,285

Printed or Typed Name

Title or Registration Number

Under the Paperwork Reduction Act of 1995, no person is required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:



Practitioners associated with Customer Number: 62574

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number

Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:



The address associated with Customer Number: 62574

OR



Firm or individual name

Address

City

State

Zip

Country

Telephone

Email

Assignee name and address: KIWI INTELLECTUAL ASSETS CORPORATION
8 F-2, NO. 1, WUQUAN 1ST RD.
XINZHUANG DIST., NEW TAPEI CITY 248022 TAIWAN

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature	CHOU HSIEN TSAI	Date	Aug 6, 2024
Name	CHOU HSIEN TSAI	Telephone	
Title	Chairman		

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0035. Public burden for this form is estimated to average 18 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. If filing this completed form by mail, send to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9299 and select option 2.

CORRECTED ADS

PTO/AIA/14 (01-22)

Approved for use through 05/31/2024. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	40186PAT-1-REI-CON <u>KIWI-1-REI-CON</u>
		Application Number	<u>17/974,866</u>
Title of Invention	SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor 1 Remove				
Legal Name				
Prefix	Given Name	Middle Name	Family Name	Suffix
	Chou Hsien		Tsai	
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service				
City	New Taipei City	Country of Residence ⁱ	TW	
Mailing Address of Inventor:				
Address 1		8F.-2, No. 1, Wuquan 1st Rd.		
Address 2		Xinzhuang Dist.		
City	New Taipei City	State/Province		
Postal Code	242	Country ⁱ	TW	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add				

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence information of this application.			
Customer Number	<u>22442</u> <u>62574</u>		
Email Address	<u>jvick@shoridanross.com</u> <u>jason.vick@wbd-us.com</u>		Add Email Remove Email

Application Information:

Title of the Invention	SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION		
Attorney Docket Number	40186PAT-1-REI-CON <u>KIWI-1-REI-CON</u>	Small Entity Status Claimed ☒	
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	29	Suggested Figure for Publication (if any)	

CORRECTED ADS

PTO/AIA/14 (01-22)

Approved for use through 05/31/2024. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	40186PAT-1-REI-CON <u>KIWI-1-REI-CON</u>
		Application Number	<u>17/974,866</u>
Title of Invention	SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	22442 <u>62574</u>		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status		Patented		<div>Remove</div>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation of	17020359	2020-09-14	RE49287	2022-11-08

CORRECTED ADS

PTO/AIA/14 (01-22)

Approved for use through 05/31/2024. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number		40186PAT-1-REI-CON <u>KIWI-1-REI-CON</u>	
		Application Number		17/974,866	
Title of Invention		SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION			
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	reissued of	12759408	2010-04-13	8198563	2012-06-12
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
17020359	reissued of	12759408	2010-04-13	8198563	2012-06-12
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.					

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
099100847	TW	2010-01-13	
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
098210021	TW	2009-06-05	
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
098117405	TW	2009-05-26	
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
098112573	TW	2009-04-15	
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

CORRECTED ADS

PTO/AIA/14 (01-22)

Approved for use through 05/31/2024. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	40186PAT-1-REI-CON <u>KIWI-1-REI-CON</u>
		Application Number	<u>17/974,866</u>
Title of Invention	SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION		

☐	<p>This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.</p> <p>NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.</p>
--------------------------	---

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	40186PAT-1-REI-CON <u>KIWI-1-REI-CON</u>
		Application Number	<u>17/974,866</u>
Title of Invention	SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

CORRECTED ADS

PTO/AIA/14 (01-22)

Approved for use through 05/31/2024. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	40186PAT-1-REI-CON <u>KIWI-1-REI-CON</u>
		Application Number	<u>17/974,866</u>
Title of Invention	SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.			
Applicant 1			
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.			
<input type="button" value="Clear"/>			
☒ Assignee		☐ Legal Representative under 35 U.S.C. 117	
☐ Person to whom the inventor is obligated to assign.		☐ Person who shows sufficient proprietary interest	
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:			
Name of the Deceased or Legally Incapacitated Inventor: <input type="text"/>			
If the Applicant is an Organization check here. ☒			
Organization Name		KIWI CONNECTION, LLC <u>KIWI INTELLECTUAL ASSETS CORPORATION</u>	
Mailing Address Information For Applicant:			
Address 1		7215 BOSQUE BLVD <u>8 F.-2, NO. 1, WUQUAN 1ST RD.</u>	
Address 2		SUITE A #102 <u>XINZHUANG DIST.</u>	
City		WACO <u>NEW TAIPEI CITY</u>	State/Province TX
Country	US <u>TW</u>	Postal Code	76740 <u>248022</u>
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

CORRECTED ADS

PTO/AIA/14 (01-22)

Approved for use through 05/31/2024. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	40186PAT-1-REI-CON <u>KIWI-1-REI-CON</u>
		Application Number	<u>17/974,866</u>
Title of Invention	SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION		

Assignee 1				
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
If the Assignee or Non-Applicant Assignee is an Organization check here. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country i		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.				

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the **INITIAL** filing of the application and either box A or B is **not** checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Jason H. Vick/			Date (YYYY-MM-DD)	2024-08-06
First Name	Jason H.	Last Name	Vick	Registration Number	45285
Additional Signature may be generated within this form by selecting the Add button.					

CORRECTED ADS

PTO/AIA/14 (01-22)

Approved for use through 05/31/2024. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	40186PAT-1-REI-CON <u>KIWI-1-REI-CON</u>
		Application Number	<u>17/974,866</u>
Title of Invention	SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

- 1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
- 3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES
PATENT AND TRADEMARK OFFICE

Page 1 of 2
P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
17/974,866

RECEIPT DATE / TIME
08/06/2024 02:27:12 PM Z ET

ATTORNEY DOCKET #
10186PAT-1-REI-CON

Title of Invention

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

Application Information

APPLICATION TYPE Utility - Reissue

PATENT # -

CONFIRMATION # 1048

FILED BY Joanne Vos

PATENT CENTER # 66673080

FILING DATE 10/27/2022

CUSTOMER # 22442

FIRST NAMED INVENTOR Chou Hsien Tsai

CORRESPONDENCE ADDRESS -

AUTHORIZED BY Jason Vick

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
Statement_under_3.73c_w_POA_KIWI-1-CON-REI.pdf	3	-	596 KB
Statement_under_3.73c_w_POA_KIWI-1-CON-REI-R3.73.pdf	(1-2) 2	Assignee showing of ownership per 37 CFR 3.73	164 KB
Statement_under_3.73c_w_POA_KIWI-1-CON-REI-PA...pdf	(3-3) 1	Power of Attorney	432 KB
CorrectedADS_KIWI-1-REI-CON.pdf	9	Application Data Sheet	574 KB

Warning: This is not a USPTO supplied ADS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.

Digest**DOCUMENT****MESSAGE DIGEST(SHA-512)**Statement_under_3.73c_w_PO
A_KIWI-1-CON-REI.pdf5ADAF1CA84574C19C7BA9D0B728A66420196360AF1E989BAF
C4A54DE6C6358ED737700E480DFD76E73325C0E150847B706
9E9364FF4749FE4C96AB2E1D04E510Statement_under_3.73c_w_PO
A_KIWI-1-CON-REI-R3.73.pdfBD16D51F370175C442A3DD28BA5EE4429B0A2EDC64BB3264
65501DE1882FF0B0312210ED8CC9A184538B0C6133A4FAA83
05E2CF5553697F941E807BD8A88F5FFStatement_under_3.73c_w_PO
A_KIWI-1-CON-REI-PA...pdfB7292FC1CCB9EB43A6B332C54CE9925A9946E29593357152A
EF4A9345F0403192C861E37B1A6D6BCA6A5355887B752205C
5BFDB816C7EF5EB4A6EDD55A120EABCorrectedADS_KIWI-1-REI-
CON.pdf5D433F20CFFB86A34790E6E6E35A0D6F87BAF4F045E70C73D
E124EB9DC9EA7069B45D9F1C6941084E499CFA774934C78BF
15B9468E6A9A97364AFBCE2994FAB6

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/974,866	10/27/2022	Chou Hsien Tsai	10186PAT-I-REI-CON	1048
22442	7590	07/30/2024		
Sheridan Ross PC 1560 Broadway Suite 1200 Denver, CO 80202			EXAMINER DONDERO, WILLIAM E	
			ART UNIT 3993	PAPER NUMBER
			NOTIFICATION DATE 07/30/2024	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

edocket@sheridanross.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

Reissue Applications

For reissue applications filed before September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the law and rules in effect on September 15, 2012. Where specifically designated, these are “pre-AIA” provisions.

For reissue applications filed on or after September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the current provisions.

Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. 8,198,563 is or was involved. These proceedings would include any trial before the Patent Trial and Appeal Board, interferences, reissues, reexaminations, supplemental examinations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification does not have any mention of the limitation, “a functional reverse mirror configuration”. However, this appears to be referring to the order of the serial numbers for the first contacts being reversed relative to the second contacts as shown in Figure 4A and other figures and described in the specification. As such, this is the interpretation used for the Office Action below. If this is correct, Applicant should put the limitation in the appropriate sections of the specification. If this is incorrect, Applicant should explain the limitation and provide support from the specification.

Consent of Assignee

The Consent of Assignee filed October 27, 2022 is a copy of the Consent of Assignee filed in the parent reissue application 17/020,359. Parent reissue application 17/020,359 was not abandoned. Therefore, submitting a copy of the Consent of Assignee from parent reissue application 17/020,359 is improper. A new Consent of Assignee must be submitted. See MPEP § 1410.02 I and § 1451 II.A, particularly the sections copied below.

MPEP § 1410.02 I:

Where a **continuation** reissue application is filed with a copy of the assignee consent from the parent reissue application, and the parent reissue application is not to be abandoned, the copy of the consent is generally not adequate for the continuation reissue application. See **MPEP § 1451**, subsection II.A, for more information.

Where a continuation reissue application is filed with a copy of the assignee consent from the parent reissue application, and the parent reissue application is, or will be abandoned, the copy of the consent should be accepted by the Office.

MPEP § 1451 II.A:

Generally, where a continuation reissue application is filed with a copy of the assignee consent from the parent reissue application but with a newly executed reissue oath/declaration, the copy of the assignee consent from

the parent reissue application is not acceptable. A copy of the assignee consent is only acceptable if the continuation reissue application corrects an error for which consent was made. Submission of a new oath or declaration is indicative of correction of a different error. Under such circumstances, OPAP will accord the continuation reissue application a filing date, and the examiner should reject the claims under **35 U.S.C. 251** and require a new consent. See **MPEP § 1410.02**.

Reissue Oath/Declaration

The reissue oath/declaration filed with this application is defective because the error which is relied upon to support the reissue application is not an error upon which a reissue can be based. See 37 CFR 1.175 and MPEP § 1414.

The reissue applicant filed two reissue declarations, i.e., reissue application declaration by the assignee and reissue application declaration by the inventor, accompanied by the instant reissue application. In the declarations, the respective declarant alleges that there exists at least one error upon which the subject reissue is based is the inclusion of claims 7-11, 16, 17, 20, 23, 25, and 27-33 in the '563 Patent because an apparent administrative error by the Office by including the non-elected claims 7-11, 16, 17, 20, 23, 25, and 27-33 in the '563 Patent.

The instant reissue application is filed to correct the administrative error in the '563 Patent, wherein the correction to the '563 Patent is an editorial or clerical error which does not cause the '563 Patent to be deemed wholly or partly inoperative or invalid' for the reasons specified in 35 U.S.C. § 251.

Furthermore, as mentioned in the above, the reissue applicant submitted two reissue declarations, i.e., reissue application declaration by the assignee and reissue application declaration by the inventor. Reissue application declaration by the inventor (form PT O/AIA/05) or reissue application declaration by the assignee (form PT O/AIA/06) may be used to prepare a declaration in a reissue application depending on the circumstances; however, filing both reissue application declaration by the

assignee and reissue application declaration by the inventor at the same time is not acceptable. See MPEP § 1414.01.

Therefore, the declared error and its correction to the '563 Patent does not provide a basis for reissue although this correction may also be included in a reissue application, where a 35 U.S.C. § 251 error is already present. See MPEP § 1402.

The reissue oath/declaration filed with this application is defective because it fails to identify at least one error which is relied upon to support the reissue application. See 37 CFR 1.175 and MPEP § 1414.

The reissue oath/declaration filed October 27, 2022 is a copy of the reissue oath/declaration filed in parent reissue application 17/020,359. As such, the reissue application is based on an oath/declaration that does not identify an error being corrected by the continuation reissue application and a new oath/declaration is required that identifies a new error or a statement explaining compliance with 37 CFR 1.175(f)(2) if appropriate. See MPEP § 1414 II.D.1.

MPEP 1414 II.D.1:

(D) For continuation or divisional reissue applications:

(1) Where a continuation reissue application is filed with a copy of the reissue oath/declaration from the parent reissue application, and the parent reissue application is not to be abandoned, the reissue oath/declaration should be accepted by the Office of Patent Application Processing (OPAP) without further evaluation, because it is an oath/declaration, albeit improper under **35 U.S.C. 251**. The examiner should, however, reject the claims of the continuation reissue application under **35 U.S.C. 251** as being based on an oath/declaration that does not identify an error being corrected by the continuation reissue application, and should require a new oath/declaration that identifies a new error or a statement explaining compliance with **37 CFR 1.175(f)(2)** if appropriate. If the same error corrected in the parent is also being corrected in the continuation reissue application, but the error is being corrected in a different way, a statement is needed to explain compliance with **37 CFR 1.175(f)(2)** for a reissue application filed on or after September 16, 2012. For these applications, a petition under **37 CFR 1.183** is not needed. For a reissue application filed before September 16, 2012, a petition under **37 CFR 1.183** will be needed to waive **pre-AIA 37 CFR 1.175(e)** in order to rely on the same error identified in the parent but being corrected in a different way. See **37 CFR**

1.175(f)(2) for reissue applications filed on or after September 16, 2012, and **pre-AIA 37 CFR 1.175(e)** for reissue applications filed before September 16, 2012. One of form paragraphs **14.01.01**, **14.01.02**, or **14.01.03** may be used.

Claim Rejections – 35 USC § 251

Claims 35-136 are rejected as being based upon a defective reissue declaration under 35 U.S.C.

251 as set forth above. See 37 CFR 1.175.

The nature of the defect(s) in the declaration is set forth in the discussion above in this Office action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

(a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 37, 66, 76, 87, 97, 107, 113, 124, 127, and 130 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement.

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for applications subject to pre-AIA 35 U.S.C. 112, the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no discussion in the specification or showing the drawings

that shows or describes a thickness of the tongue is less than a third of a height of the connection slot.

Further, there is no discussion in the specification or showing in the drawings of the tongue having rounded corners on to sides of the tongue.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis (i.e., changing from AIA to pre-AIA) for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 35-136 is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Teicher (US-20060024997) in view of Lee (WO-2009069969). Regarding Claims 35, 37, 42, 49, and 56, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element); a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with grooves 156, and a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being

disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]); at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e) (Figures 1-10). Teicher does not expressly disclose the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second

contacts; in the first and second operational states, the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; and the tongue and the plastic base are integrally formed.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts

(depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration or mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 36, Teicher discloses the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e) (Figures 1-10).

Regarding Claim 38, Teicher discloses a portion of each of the first contacts, in the at least one row of first contacts, is coplanar with a portion of the first surface of the tongue (depicted in Figures 5a and 5c) (Figures 1-10).

Regarding Claim 39, Teicher discloses a portion of each of the second contacts, in the at least one row of second contacts, is coplanar with a portion of the second surface of the tongue (depicted in Figures 5a and 5c) (Figures 1-10).

Regarding Claim 40, Teicher discloses a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base (Figures 1-10).

Regarding Claim 41, Teicher discloses the socket structure is a universal serial bus socket structure (see Abstract line 1) (Figures 1-10).

Regarding Claim 43, Teicher discloses each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b) (Figures 1-10).

Regarding Claims 44, 47, 48, Teicher discloses each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]) (Figures 1-10).

Regarding Claims 45, and 50-51, Teicher discloses at least two of the first contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 154 in grooves 156 are electrically separate), and at least two of the second contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 166 in grooves on lower side 162 are electrically separate) (Figures 1-10).

Regarding Claim 46, Teicher discloses a rear cover attached to the plastic base (see Figures 5a and 6a) (Figures 1-10).

Regarding Claim 52, Teicher discloses the at least one row of first contacts and respective first pins are located at ends of respective ones of a row of first terminals and the at least one row of second contacts and respective second pins are located at ends of respective ones of a row of second terminals (see Figure 5b where the terminals are the strips between the contacts and the pins) (Figures 1-10).

Regarding Claim 53, Teicher discloses a portion of a first contact projects beyond one surface of the tongue, and a portion of a second contact projects beyond another surface of the tongue (see Figures 5a and 5c) (Figures 1-10).

Regarding Claim 54, Teicher discloses a portion of one of the first contacts is at least partially included in the first surface with grooves (depicted in Figures 5a-5c) (Figures 1-10).

Regarding Claim 55, Teicher discloses a portion of one of the second contacts is at least partially included in the second surface with grooves (depicted in Figures 5a-5c) (Figures 1-10).

Regarding Claims 57-59, and 64-66, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element); a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a top side with a first surface 158 with grooves 156, and bottom side with a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]); at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one

row of second contacts 166; and a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154; the socket structure is operatively connected to the plug (see Figure 5e); wherein the tip of the tongue is taper (tongue 152 tapers to a point in Figures 5a, 5d, 5e) (Figures 1-10). Teicher does not expressly disclose the socket structure is operative to simultaneously electrically connect on the top and bottom side of the tongue via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; the tongue and plastic base are integrally formed; wherein the tongue has rounded corners on two side of the tongue; and a thickness of the tongue is less than a third of the connection slot.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a top side with a first surface (surface with u in Figure 2), and bottom side with a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d,

Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect on the top and bottom of the tongue via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u); and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded); and a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot (Figures 1-9). It would have been

obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base and rounded corners, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue to the tongue or plug as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 60, Teicher discloses a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base (Figures 1-10).

Regarding Claim 61, Teicher discloses at least two of the first contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 154 in grooves 156 are electrically separate), and at least two of the second contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 166 in grooves on lower side 162 are electrically separate) (Figures 1-10).

Regarding Claim 62, Teicher discloses the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10).

Regarding Claim 63, Teicher in view of Lee does not expressly disclose the at least one row of first contacts includes at least five contacts, and the at least one row of second contacts includes at least five contacts.

However, it would have been obvious design choice to one of ordinary skill in the art at the time the invention was made to have any number of contacts, including at least five, in the first and second rows of contact to match the number of contacts of the plug being used in the socket.

Regarding Claim 67, Teicher discloses the socket structure is a universal serial bus socket structure (see Abstract line 1) (Figures 1-10).

Regarding Claims 68-70, and 74-76, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element); a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with grooves 156, and a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]); at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is

electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e) (Figures 1-10). (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at least six contacts; the at least one second row of contacts includes at least six contacts; the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in

Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is

disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Further, it would have been obvious design choice to one of ordinary skill in the art at the time the invention was made to have any number of contacts, including at least six, in the first and second rows of contact to match the number of contacts of the plug being used in the socket.

Regarding Claim 71, Teicher discloses a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base (Figures 1-10).

Regarding Claim 72, Teicher discloses at least two of the first contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 154 in grooves 156 are electrically separate), and at least two of the second contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 166 in grooves on lower side 162 are electrically separate) (Figures 1-10).

Regarding Claim 73, Teicher discloses the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10).

Regarding Claim 77, Teicher discloses the socket structure is a universal serial bus socket structure (see Abstract line 1) (Figures 1-10).

Regarding Claim 78, Teicher discloses each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]) (Figures 1-10).

Regarding Claims 79-82, and 85-87, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded

plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with grooves 156, and a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the

connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e) (Figures 1-10). (Figures 1-10). Teicher does not expressly disclose the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND__u, D-__u, D+__u, Vbus__u)

separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a

thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 83, Teicher discloses at least two of the first contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 154 in grooves 156 are electrically separate), and at least two of the second contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 166 in grooves on lower side 162 are electrically separate) (Figures 1-10).

Regarding Claim 84, Teicher discloses the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10).

Regarding Claim 88, Teicher discloses the socket structure is a universal serial bus socket structure (see Abstract line 1); and each of the first contacts is electrically connected to the respective

first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]) (Figures 1-10).

Regarding Claims 89-92, and 95-97, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with grooves 156, and a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166

connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e) (Figures 1-10). (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt.1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second

surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND__d, D-__d, D+__d, Vbus__d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND__u, D-__u, D+__u, Vbus__u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Further, it would have been obvious design choice to one of ordinary skill in the art at the time the invention was made to have any number of contacts, including more than four, in the first and second rows of contact to match the number of contacts of the plug being used in the socket.

Regarding Claim 93, Teicher discloses at least two of the first contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 154 in grooves 156 are electrically separate), and at least two of the second contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 166 in grooves on lower side 162 are electrically separate) (Figures 1-10).

Regarding Claim 94, Teicher discloses the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10).

Regarding Claim 98, Teicher discloses the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); a portion of a first contact projects beyond one surface of the tongue, and a portion of a second contact projects beyond another surface of the tongue (see Figures 5a and 5c); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10).

Regarding Claims 99-102, and 105-107, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with grooves 156, and a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the

connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e) (Figures 1-10). (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface

(surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the

connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND__u, D-_u, D+_u, Vbus__u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 103, Teicher discloses at least two of the first contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 154 in grooves 156 are electrically separate), and at least two of the second contacts are not in electrical communication with one another (see Figure 5b wherein all four contacts 166 in grooves on lower side 162 are electrically separate) (Figures 1-10).

Regarding Claim 104, Teicher discloses the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10).

Regarding Claim 108, Teicher discloses the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); a portion of a first contact projects beyond one surface of the tongue, and a portion of a second contact projects beyond another surface of the tongue (see Figures 5a and 5c); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10).

Regarding Claims 109-110, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with grooves 156, and a second surface 162 with grooves (see paragraph [0140]), the second surface

disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected

to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface

(surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the

connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND__u, D-_u, D+_u, Vbus__u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claims 111-112, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158

with grooves 156, and a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the

tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion

between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a

second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claims 113-114, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one

row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with grooves 156, and a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection

terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or

PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and

down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND__u, D-_u, D+_u, Vbus__u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 115, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of

the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with grooves 156, and a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first

surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in

Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is

disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 116, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the

plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a top side (at 158) with a first castellated surface 158 (formed by rising and falling of surface due to grooves 156), and a bottom side with a second castellated surface 162 (formed by rising and falling of surface due to grooves; see paragraph [0140] for disclosure of grooves), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second

contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is

less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue (functional language, the socket of Lee is capable of connecting the top side, the bottom side, and the top side and bottom side with two different plugs the detection system described in paragraph [37] would just detect both top side and the bottom side are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is

thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND__d, D-__d, D+__d, Vbus__d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND__u, D-__u, D+__u, Vbus__u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 117, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with grooves 156, and a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing), wherein a first portion (curved portion pointed to by reference lines of 154 in Figure 5b stand above/proud surface 158) of each of the first contacts is proud of a top-most surface of the tongue; and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing), , wherein a first portion (curved portion pointed to by reference lines of 166 in Figure

5b stand above/proud surface 162) of each of the first contacts is proud of a top-most surface of the tongue; the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least

one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts

(functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner

as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 118, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a top side (at 158) with a first castellated surface 158 (formed by rising and falling of surface due to grooves 156), and a bottom side with a second castellated surface 162 (formed by rising and falling of surface due to grooves; see paragraph [0140] for disclosure of grooves), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b

wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of

one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the

second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue (functional language, the socket of Lee is capable of connecting the top side, the bottom side, and the top side and bottom side with two different plugs the detection system described in paragraph [37] would just detect both top side and the bottom side are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc

including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 119, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a top side (at 158) with a first castellated surface 158 (formed by rising and falling of surface due to grooves 156), and a bottom side with a second castellated surface 162 (formed by rising and falling of surface due to grooves; see paragraph [0140] for disclosure of grooves), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the

connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the

respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the

connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue (functional language, the socket of Lee is capable of connecting the top side, the bottom side, and the top side and bottom side with two different plugs the detection system described in paragraph [37] would just detect both top side and the bottom side are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection

slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 120, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a top side (at 158) with a first castellated surface 158 (formed by rising and falling of surface due to grooves 156), and a bottom side with a second castellated surface 162 (formed by rising and falling of surface due to grooves; see paragraph [0140] for disclosure of grooves), the second surface disposed opposite the first surface (see paragraph

[0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in

Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface

(surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue (functional language, the socket of Lee is capable of connecting the top side, the bottom side, and the top side and bottom side with two different plugs the detection system described in paragraph [37] would just detect both top side and the bottom side are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted

as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 121, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection

terminals (176, see paragraph [0141]); a tongue 152, which has a top side (at 158) with a first castellated surface 158 (formed by rising and falling of surface due to grooves 156), and a bottom side with a second castellated surface 162 (formed by rising and falling of surface due to grooves; see paragraph [0140] for disclosure of grooves), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the

connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue (functional language, the socket of Lee is capable of connecting the top side, the bottom side, and the top side and bottom side with two different plugs the detection system described in paragraph [37] would just detect both top side and the bottom side are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of

connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND__d, D-__d, D+__d, Vbus__d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND__u, D-__u, D+__u, Vbus__u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claims 122, and 124, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158, and a second surface 162, the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection

terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; the at least one row of first contacts have increasing assigned serial numbers in a first direction and the at least one row of second contacts have decreasing assigned serial numbers in the first direction; in the first and second operational states, the tongue is disposed at a central location within

the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; the tongue is operative for signal transmission on one side when connected in a first configuration, and operative for signal transmission simultaneously on both sides when connected in a second configuration; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the tongue is operative for signal transmission on one side when connected in a first configuration, and operative for signal transmission simultaneously on both sides when connected in a second configuration (functional language, the socket of Lee is capable of signal transmission on one side when

connected in a first configuration as shown in the drawings and specification, and operative for signal transmission simultaneously on both side when connected in a second configuration, such as two plugs inserted above and below the tongue the detection system described in paragraph [37] would just detect both rows of contacts as active and flow the signal from both sets of contacts); the at least one row of first contacts have increasing assigned serial numbers in a first direction and the at least one row of second contacts have decreasing assigned serial numbers in the first direction (depicted in Figure 4 as the GND, D-, D+, and Vbus are reversed for the first and second contacts in the left to right direction which is identical to increasing serial numbers for the first contacts and decreasing serial numbers for the second contacts in the left to right direction), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower

unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 123, Teicher discloses wherein the first and the second surfaces of the tongue are castellated (formed by the rising and falling due to grooves 156 and ones described in paragraph [140] on the second surface 162), and wherein the first contacts are at least partially on a grooved portion of the first surface such that at least a portion of the first contacts are proud of the first surface (as shown in Figure 5b flat portions of 154 would sit in the grooves and curved end portions pointed to by reference lines 154 would stand up/proud out of the grooves), and the second contacts are at least partially on a grooved portion of the second surface such that at least a portion of the second contacts are proud of the second surface (as shown in Figure 5b flat portions of 166 would sit in the grooves and curved end portions pointed to by reference lines 166 would stand up/proud out of the grooves) (Figures 1-10).

Regarding Claim 125, 127-128, and 130, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded

plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158, and a second surface 162, the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite

orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); the socket structure is further operative to receive one of two different types of universal serial bus plugs (functional language, Teicher's socket is capable of receiving a usb plug with a complete metal housing as shown in the drawing or one without a complete metal housing, particularly without the lower portion of the metal housing) each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to electrically connect on the top side, the bottom side, and the top side and the bottom side of the tongue; the at least one row of first contacts have increasing assigned serial numbers in a first direction and the at least one row of second contacts have decreasing assigned serial numbers in the first direction; in the first and second operational states, the tongue is disposed at a

central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; the tongue is operative for signal transmission on one side when connected in a first configuration, and operative for signal transmission simultaneously on both sides when connected in a second configuration; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the tongue is operative for signal transmission on one side when connected in a first configuration, and operative for signal transmission simultaneously on both sides when connected in a second configuration (functional language, the socket of Lee is capable of signal transmission on one side when

connected in a first configuration as shown in the drawings and specification, and operative for signal transmission simultaneously on both side when connected in a second configuration, such as two plugs inserted above and below the tongue the detection system described in paragraph [37] would just detect both rows of contacts as active and flow the signal from both sets of contacts); the at least one row of first contacts have increasing assigned serial numbers in a first direction and the at least one row of second contacts have decreasing assigned serial numbers in the first direction (depicted in Figure 4 as the GND, D-, D+, and Vbus are reversed for the first and second contacts in the left to right direction which is identical to increasing serial numbers for the first contacts and decreasing serial numbers for the second contacts in the left to right direction), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower

unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claims 126, and 129, Teicher discloses wherein the first and the second surfaces of the tongue are castellated (formed by the rising and falling due to grooves 156 and ones described in paragraph [140] on the second surface 162), and wherein the first contacts are at least partially on a grooved portion of the first surface such that at least a portion of the first contacts are proud of the first surface (as shown in Figure 5b flat portions of 154 would sit in the grooves and curved end portions pointed to by reference lines 154 would stand up/proud out of the grooves), and the second contacts are at least partially on a grooved portion of the second surface such that at least a portion of the second contacts are proud of the second surface (as shown in Figure 5b flat portions of 166 would sit in the grooves and curved end portions pointed to by reference lines 166 would stand up/proud out of the grooves) (Figures 1-10).

Regarding Claim 131, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element)

having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with recesses 156, and a second surface 162 with recesses (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second

operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt.1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second

surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND__d, D-__d, D+__d, Vbus__d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND__u, D-__u, D+__u, Vbus__u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 132, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133],

wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a top side (at 158) with a first surface 158 with grooves 156, and a bottom side (at 162) with a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of

connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect on the top side and the bottom side of the tongue; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third

of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect on the top side and the bottom side of the tongue (functional language, the socket of Lee is capable of simultaneously connecting the top side and bottom side with two different plugs the detection system described in paragraph [37] would just detect both top side and the bottom side are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two

separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 133, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a top side (at 158) with a first surface 158 with grooves 156, and a bottom side (at 162) with a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is

thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect on the top side and the bottom side of the tongue; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of

second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect on the top side and the bottom side of the tongue (functional language, the socket of Lee is capable of simultaneously connecting the top side and bottom side with two different plugs the detection system described in paragraph [37] would just detect both top side and the bottom side are active and flow the signal from both sets of

contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse

mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration or mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 134, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a first surface 158 with recesses 156, and a second surface 162 with recesses (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin

extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative

to simultaneously electrically connect via the first and second contacts; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2); a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect via the first and second contacts (functional language, the socket of Lee is capable of simultaneously connecting the first and second

contacts with two different plugs the detection system described in paragraph [37] would just detect both contacts are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in

the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 135, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a top side (at 158) with a first surface 158 with grooves 156, and a bottom side (at 162) with a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the

second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not

expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect on the top side and the bottom side of the tongue; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure 2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base;

the socket structure is operative to simultaneously electrically connect on the top side and the bottom side of the tongue (functional language, the socket of Lee is capable of simultaneously connecting the top side and bottom side with two different plugs the detection system described in paragraph [37] would just detect both top side and the bottom side are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the

tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Regarding Claim 136, Teicher discloses a socket structure with duplex electrical connection, the socket structure comprising: a plastic base (rear housing in Figures 5a and 6a; see paragraph [0133], wherein it anticipates that the plastic base is typically formed as a unitary molded plastic or element) having a metal housing (electrically conducting sleeve 148 of Figure 5a) at least partially covering the plastic base; a connection slot (space within sleeve 148 in Figures 5a-5b), which is disposed in front of the plastic base and configured to be connected to a plug 168 having at least one row of connection terminals (176, see paragraph [0141]); a tongue 152, which has a top side (at 158) with a first surface 158 with grooves 156, and a bottom side (at 162) with a second surface 162 with grooves (see paragraph [0140]), the second surface disposed opposite the first surface (see paragraph [0140]), the tongue being disposed on one end of the plastic base and within the connection slot (see Figure 5a), such that chambers of the connection slot (hollow sections of the space within sleeve 148 in Figures 5a-5b) on two sides of the tongue (on the upper and lower sides of the tongue arrangement 150 of Figure 5b) allow the plug 168 to be normally and oppositely inserted and positioned into the connection slot (inserting first orientation and second orientation, see paragraphs [0109] and [0142]) based on an operational state when the socket structure is connected to the plug; at least one row of first contacts 154 separately arranged on the first surface of the tongue, wherein each of the first contacts is

electrically connected to a respective first pin extending out of the plastic base (see Figure 5b wherein electrical contact 154 connected to a pin extending out of the rear housing); and at least one row of second contacts 166 separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin extending out of the plastic base (see Figure 5b, wherein the electrical contact 166 connected to a pin extending out of the rear housing); the at least one row of first contacts includes at least four contacts (see Figures 5a-5c); the at least one row of second contacts includes at least four contacts (see Figures 5a-5c); and the socket structure is thereby configured for two separate operational states: a first operational state (depicted in Figures 5d-5e) when the plug is normally inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the second surface 162 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of second contacts 166 and the tongue is disposed within the connection slot; a second operational state (opposite orientation of the plug depicted in Figures 5d-5e) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals 176 of the plug facing the first surface 158 of the tongue, the at least one row of connection terminals 176 of the plug are electrically connected to the at least one row of first contacts 154, and the tongue is disposed within the connection slot; and wherein the socket structure is operatively connected to the plug (depicted in Figure 5e); wherein a portion of the tongue opposite the plastic base is tapered (tongue 152 tapers to a point in Figures 5a, 5d, 5e); the socket structure is a universal serial bus socket structure (see Abstract line 1); each of the first contacts is electrically connected to the respective first pin extending out of the plastic base through a rear cover and each of the second contacts is electrically connected to the respective second pin extending out of the plastic base through the rear cover (see Figures 5b, 5d, and 6a; See paragraphs [0145]-[0146]); the tongue only contacts an interior portion of the plug when it is inserted (depicted in Figure 5e); each contact of the first and second contacts is a portion of a respective

terminal (depicted in Figure 5b); the grooves in the first surface of the tongue each included a portion of one of the first contacts (see Figures 5a-5c), and the grooves in the second surface of the tongue each include a portion of one of the second contacts (see Figures 5a-5c) (Figures 1-10). Teicher does not expressly disclose the at least one first row of contacts includes at more than four contacts; the at least one second row of contacts includes more than four contacts; the socket structure is operative to simultaneously electrically connect on the top side and the bottom side of the tongue; the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts; in the first and second operational states, the tongue is disposed at a central location within the connection slot; the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue; a thickness of the tongue is less than a third of a height of the connection slot; the tongue and the plastic base are integrally formed; and wherein the tongue has rounded corners on two side of the tongue.

However, Lee teaches a socket structure with duplex electrical connection, the socket structure comprising: a base (hatched portion surrounding cnt1 in Figure 2); a connection slot (space within rc in Figures 2-4), which is disposed in front of the base and configured to be connected to a plug (PG1 or PG2) having at least one row of connection terminals (e1 or e2) ; a tongue (narrower hatched portion between u and d in Figure 2), which has a first surface (surface with u in Figure 2), and a second surface (surface with d in Figure 2), the second surface disposed opposite the first surface (depicted in Figure 2), the tongue being disposed on one end of the plastic base and within the connection slot (depicted in Figure 2), such that chambers (open space above and below the tongue) of the connection slot on two sides of the tongue allow the plug to be normally and oppositely inserted and positioned into the connection slot (as depicted in Figure 2); at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u) separately arranged on the first surface of the tongue, wherein each of the first contacts is electrically connected to a respective first pin extending out of the base (extending from the base into pcb in Figure

2); and at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) separately arranged on the second surface of the tongue, wherein: each of the second contacts is electrically connected to a respective second pin (other pin extending from the base into pcb in Figure 2) extending out of the base; the socket structure is operative to simultaneously electrically connect on the top side and the bottom side of the tongue (functional language, the socket of Lee is capable of simultaneously connecting the top side and bottom side with two different plugs the detection system described in paragraph [37] would just detect both top side and the bottom side are active and flow the signal from both sets of contacts); the at least one row of first contacts has a functional reverse mirror configuration relative to the at least one row of second contacts (depicted in Figure 4 as the GND, D-, D+, and Vbus contacts are reversed for the first and second contacts), and the socket structure is thereby configured for two separate operational states: a first operational state (with PG1 inserted as in Figure 2) when the plug is normally inserted into the connection slot with the at least one row of connection terminals (e1) of the plug facing the second surface of the tongue, the at least one row of connection terminals (e1) of the plug are electrically connected to the at least one row of second contacts (GND_d, D-_d, D+_d, Vbus_d) and the tongue is disposed within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); and a second operational state (with PG2 inserted as in Figure 2) when the plug is oppositely inserted into the connection slot with the at least one row of connection terminals (e2) of the plug facing the first surface of the tongue, the at least one row of connection terminals (e2) of the plug are electrically connected to the at least one row of first contacts (GND_u, D-_u, D+_u, Vbus_u), and the tongue is disposed at a central location within the connection slot, wherein the connection slot is symmetric with symmetric up and down chambers, and symmetric left and right chambers around the tongue (depicted in Figure 4); a thickness of the tongue is less than a third of a height of the connection slot (as depicted in Figure 2 e2 must fit between the tongue including u and rc including the upper

unmarked projection and e1 must fit between the tongue including d and rc including the lower unmarked projection as such the thickness of the tongue must be less than a third the height of the connection slot; and the tongue and the base are integrally formed (see Figure 2); and wherein the tongue has rounded corners on two side of the tongue (at the top and bottom of the cantilevered end of the tongue the sides are rounded in the same manner as Applicant's corners are rounded) (Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the socket with a fixed tongue integral with the base, symmetric chambers, and functional reverse mirror configuration of the contacts to allow simultaneous connection of two plugs and prevent damage, wear, and instability from vibration of mechanical shock of the moveable tongue as taught by Lee in lines 6-9 of paragraph [1].

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the

reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The filing of a terminal disclaimer by itself is not a complete reply to a nonstatutory double patenting (NSDP) rejection. A complete reply requires that the terminal disclaimer be accompanied by a reply requesting reconsideration of the prior Office action. Even where the NSDP rejection is provisional the reply must be complete. See MPEP § 804, subsection I.B.1. For a reply to a non-final Office action, see 37 CFR 1.111(a). For a reply to final Office action, see 37 CFR 1.113(c). A request for reconsideration while not provided for in 37 CFR 1.113(c) may be filed after final for consideration. See MPEP §§ 706.07(e) and 714.13.

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The actual filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/apply/applying-online/eterminal-disclaimer.

Claims 35-36, 40-65, 68-75, 79-86, 89-96, 99-106, 109-112, 115-123, 125-126, 128-129, and 131-136 are rejected on the ground of nonstatutory double patenting as being unpatentable over claim 34-68 of U.S. Patent No. RE49,287 (referred to hereinafter as US '287) in view of Harkabi et al. (US-7361059). The claims of US '287 claims a socket structure having a tongue with a top side (side of the

first surface) and bottom side (side of the second surface) operative to simultaneously electrically connect via the first and second contacts on the top and bottom side of the tongue as the symmetry limitations in the last two paragraph would allow for a plug in each of the upper and lower chambers at the same time, the tongue only contacts an interior portion of the plug when the plug is inserted (as the claimed structure would not allow the tongue to contact anything but the interior portion of the plug) and the other limitations of the instant claim(s) except for the surface of the tongue having grooves; the first row of contacts has a function reverse mirror configuration relative to the at least one row of second contacts; a portion of a first contact projects beyond one surface of the tongue, and a portion of a second contact projects beyond another surface of the tongue; a portion of one of the first contacts is at least partially included in the first surface with grooves; a portion of one of the second contacts is at least partially included in the second surface with grooves; wherein the tongue has rounded corners on two side of the tongue; and a tip of the tongue is tapered.

However, Harkabi et al. teaches a socket structure with a tongue 401 having a first surface (upper surface of 401 in Figure 11) with grooves (defined by inset of upper contacts 403 into 401 as shown in Figure 11 which form a castellated surface due to the rising and falling of the surface due to the grooves) and a second surface (lower surface of 401 in Figure 11) with grooves (defined by inset of lower contacts 403 into 401 as shown in Figure 11); and the first row of contacts has a reverse mirror configuration relative to the at least one row of second contacts (1,2,3,4 orientation of the upper set of 403 compared to 4,3,2,1 orientation of the lower set of 403 in Figure 11); a portion of a first contact projects beyond one surface of the tongue, and a portion of a second contact projects beyond another surface of the tongue (depicted in Figure 11); a portion of one of the first contacts is at least partially included in the first surface with grooves (depicted in Figure 11); and a portion of one of the second contacts is at least partially included in the second surface with grooves (depicted in Figure 11); a tip of the tongue is tapered (as depicted in Figure 10c) (Figures 1-14). It would have been obvious to one of

ordinary skill in the art before the invention was made to add grooves and the functional reverse mirror configuration to the socket structure of US '287 as taught by Harkabi et al. to allow for a secure connection of the contacts to the tongue and a correct electrical connection to the plug when it is oriented in the opposite position from normal.

Regarding Claims 63, 68, 79, and 89, US '287 in view of Harkabi et al. does not expressly disclose the at least one row of first contacts includes at least four, more than four, at least five, or at least six contacts, and the at least one row of second contacts includes at least four, more than four, at least five, or at least six contacts.

However, it would have been obvious design choice to one of ordinary skill in the art at the time the invention was made to have any number of contacts, including at least four, more than four, at least five or at least six, in the first and second rows of contact to match the number of contacts of the plug being used in the socket.

Regarding Claims 64, 74, 85, and 95, US '287 in view of Harkabi et al. does not expressly disclose the tongue has rounded corners on two sides. However, it would have been obvious design choice to one of ordinary skill in the art at the time of the invention to round the corners of the side of the tongue to prevent sharp edges from damaging the plug as it is put into the socket.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM E DONDERO whose telephone number is (571)272-5590. The examiner can normally be reached Monday-Friday 6 am - 4 pm ET, Alternate Fridays.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eileen D Lillis can be reached on 571-272-6928. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/WILLIAM E DONDERO/
Reexamination Specialist, Art Unit 3993

CONFEREES: /WILLIAM C DOERRLER/
Reexamination Specialist, Art Unit 3993

/EILEEN D LILLIS/
SPRS, Art Unit 3993

<i>Index of Claims</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	07/08/2024								
	1	-								
	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	-								
	10	-								
	11	-								
	12	-								
	13	-								
	14	-								
	15	-								
	16	-								
	17	-								
	18	-								
	19	-								
	20	-								
	21	-								
	22	-								
	23	-								
	24	-								
	25	-								
	26	-								
	27	-								
	28	-								
	29	-								
	30	-								
	31	-								
	32	-								
	33	-								
	34	-								
	35	✓								
	36	✓								
	37	✓								
	38	✓								
	39	✓								
	40	✓								
	41	✓								
	42	✓								

<i>Index of Claims</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

CLAIM		DATE								
Final	Original	07/08/2024								
	43	✓								
	44	✓								
	45	✓								
	46	✓								
	47	✓								
	48	✓								
	49	✓								
	50	✓								
	51	✓								
	52	✓								
	53	✓								
	54	✓								
	55	✓								
	56	✓								
	57	✓								
	58	✓								
	59	✓								
	60	✓								
	61	✓								
	62	✓								
	63	✓								
	64	✓								
	65	✓								
	66	✓								
	67	✓								
	68	✓								
	69	✓								
	70	✓								
	71	✓								
	72	✓								
	73	✓								
	74	✓								
	75	✓								
	76	✓								
	77	✓								
	78	✓								
	79	✓								
	80	✓								
	81	✓								
	82	✓								
	83	✓								
	84	✓								
	85	✓								
	86	✓								
	87	✓								
	88	✓								
	89	✓								
	90	✓								
	91	✓								
	92	✓								
	93	✓								
	94	✓								

<i>Index of Claims</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

CLAIM		DATE							
Final	Original	07/08/2024							
	95	✓							
	96	✓							
	97	✓							
	98	✓							
	99	✓							
	100	✓							
	101	✓							
	102	✓							
	103	✓							
	104	✓							
	105	✓							
	106	✓							
	107	✓							
	108	✓							
	109	✓							
	110	✓							
	111	✓							
	112	✓							
	113	✓							
	114	✓							
	115	✓							
	116	✓							
	117	✓							
	118	✓							
	119	✓							
	120	✓							
	121	✓							
	122	✓							
	123	✓							
	124	✓							
	125	✓							
	126	✓							
	127	✓							
	128	✓							
	129	✓							
	130	✓							
	131	✓							
	132	✓							
	133	✓							
	134	✓							
	135	✓							
	136	✓							

<i>Search Notes</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

CPC - Searched*		
Symbol	Date	Examiner
H01R 29/00	07/01/2024	/WED/
H01R 27/00	07/01/2024	/WED/
H01R 12/58,716	07/01/2024	/WED/
H01R 13/64,642,658	07/01/2024	/WED/
H05K 5/0278	07/01/2024	/WED/
G06K 19/07732	07/01/2024	/WED/

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

--	--

<i>Search Notes</i> 	Application/Control No. 17/974,866	Applicant(s)/Patent Under Reexamination Tsai, Chou Hsien
	Examiner WILLIAM E DONDERO	Art Unit 3993

Search Notes		
Search Notes	Date	Examiner
Text Search - see attached printout	07/01/2024	/WED/
Applicant/Assignee Search	07/01/2024	/WED/
Inventor Name Search	07/01/2024	/WED/
PDP (Patent Data Portal) Continuity Search	07/01/2024	/WED/
Reviewed Underlying patent file wrapper for US 8,198,563 (12/759,408)	07/01/2024	/WED/
Review Parent Reissue Application/Patent RE49,287 (17/020,359)	07/01/2024	/WED/
PTACTS for AIA Proceedings: None	07/01/2024	/WED/

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

--	--

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	1	of	18	Attorney Docket Number	10186PAT-1-REI-CON

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number Number-kind Code ^{2 (if known)}	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	3795037	03-05-1974	Luttmer	
	2	3808577	04-30-1974	Mathauser	
	3	3810258	05-07-1974	Mathauser	
	4	4253719	03-03-1981	Mcginley	
	5	4258969	03-31-1981	Stallard	
	6	4421371	12-20-1983	Clark et al.	
	7	4537459	08-27-1985	Brennan et al.	
	8	4700998	10-20-1987	Hvezda et al.	
	9	4822303	04-18-1989	Nakamura et al.	
	10	5135406	08-04-1992	Ishikawa	
	11	5293013	03-08-1994	Takahashi	
	12	5295843	03-22-1994	Davis et al.	
	13	5431578	07-11-1995	Wayne	
	14	5445528	08-29-1995	Frantz	
	15	5496186	03-05-1996	Dobbelaere et al.	
	16	5518416	05-21-1996	Kantner et al.	
	17	5542850	08-06-1996	Frantz	
	18	5591050	01-07-1997	Sueoka	
	19	5595503	01-21-1997	Pittman et al.	
	20	5644470	07-01-1997	Benedict et al.	
	21	5772448	06-30-1998	Ekrot et al.	
	22	5773901	06-30-1998	Kantner	
	23	5800220	09-01-1998	Feeny et al.	
	24	5941729	08-24-1999	Sri-jayantha	
	25	5964610	10-12-1999	Mccoy	
	26	6033247	03-07-2000	Gregory	
	27	6074225	06-13-2000	Wu et al.	
	28	6095861	08-01-2000	Lin et al.	
	29	6127941	10-03-2000	Van	
	30	6132223	10-17-2000	Seeley et al.	
	31	6132254	10-17-2000	Wu	
	32	6190190	02-20-2001	Daly et al.	
	33	6257930	07-10-2001	Yu	
	34	6352450	03-05-2002	Bronk et al.	

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	2	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	35	6364699	04-02-2002	Hwang et al.	
	36	6394813	05-28-2002	Stout et al.	
	37	6417718	07-09-2002	Ota	
	38	6461192	10-08-2002	Kwoka	
	39	6530793	03-11-2003	Eichhorn et al.	
	40	6544075	04-08-2003	Liao	
	41	6565366	05-20-2003	Wu	
	42	6599152	07-29-2003	Oliphant et al.	
	43	6609928	08-26-2003	Le	
	44	6744634	06-01-2004	Yen	
	45	6792487	09-14-2004	Kao	
	46	6796844	09-28-2004	Edwards	
	47	6840806	01-11-2005	Kodama	
	48	6854984	02-15-2005	Lee et al.	
	49	6887108	05-03-2005	Wu	
	50	6901457	05-31-2005	Toombs et al.	
	51	6964582	11-15-2005	Zhuang et al.	
	52	6948983	09-27-2005	Peng	
	53	6962510	11-08-2005	Chen et al.	
	54	6971915	12-06-2005	Mao et al.	
	55	6981887	01-03-2006	Mese et al.	
	56	6991483	01-31-2006	Milan et al.	
	57	7001192	02-21-2006	Yeh	
	58	7001201	02-21-2006	Peng	
	59	7037120	05-02-2006	Yeh	
	60	7059914	06-13-2006	Tsai	
	61	7090541	08-15-2006	Ho	
	62	7094086	08-22-2006	Teicher	
	63	7094089	08-22-2006	Andre et al.	
	64	7150651	12-19-2006	Yuan et al.	
	65	7155545	12-26-2006	Wang	
	66	7160125	01-09-2007	Teicher	
	67	7165998	01-23-2007	Lee et al.	
	68	7182646	02-27-2007	Chou et al.	
	69	7198522	04-03-2007	Ho et al.	
	70	7249978	07-31-2007	Ni	
	71	7269004	09-11-2007	Ni et al.	
	72	7275940	10-02-2007	Chen	
	73	7300320	11-27-2007	Lee	

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFEE
Sheet	3	of	18	Attorney Docket Number	10186PAT-1-REI-CON

74	7314383	01-01-2008	Ho et al.	
75	7318752	01-15-2008	Fujimoto et al.	
76	7329128	02-12-2008	Awad	
77	7341458	03-11-2008	Koh	
78	7347747	03-25-2008	Shimizu	
79	7352601	04-01-2008	Minneman et al.	
80	7354314	04-08-2008	Sprouse et al.	
81	7359208	04-15-2008	Ni	
82	7361059	04-22-2008	Harkabi et al.	
83	7363947	04-29-2008	Teicher	
84	7387539	06-17-2008	Trenne	
85	7402086	07-22-2008	Pomerantz et al.	
86	7407390	08-05-2008	Ni	
87	7416413	08-26-2008	Liao	
88	7440286	10-21-2008	Hiew et al.	
89	7440287	10-21-2008	Ni et al.	
90	7458825	12-02-2008	Atsmon et al.	
91	7462071	12-09-2008	Wu	
92	7465181	12-16-2008	Bridges et al.	
93	7467977	12-23-2008	Yi et al.	
94	7470160	12-30-2008	Mostoller et al.	
95	7500861	03-10-2009	Harkabi et al.	
96	7517253	04-14-2009	Chiang	
97	7547218	06-16-2009	Hiew et al.	
98	7553172	06-30-2009	Chiu et al.	
99	7572153	08-11-2009	Trenne	
100	7591657	09-22-2009	Teicher	
101	7601034	10-13-2009	Aekins et al.	
102	7604512	10-20-2009	Chen	
103	7628619	12-08-2009	Chuang	
104	7628655	12-08-2009	Chen	
105	7635280	12-22-2009	Crumlin et al.	
106	7641519	01-05-2010	Chen	
107	7654871	02-02-2010	Yi et al.	
108	7670156	03-02-2010	Chen	
109	7682169	03-23-2010	Park et al.	
110	7710736	05-04-2010	Middlekauff et al.	
111	7731535	06-08-2010	Wan et al.	
112	7740499	06-22-2010	Willey et al.	

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	4	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	113	7918689	04-05-2011	Sloey et al.	
	114	8043099	10-25-2011	Ni et al.	
	115	8073985	12-06-2011	Ni et al.	
	116	8079879	12-20-2011	Chiang	
	117	8167638	05-01-2012	Wojcik et al.	
	118	8198563	06-12-2012	Tsai 04/13/2010	
	119	8241047	08-14-2012	Ni et al.	
	120	8257287	09-04-2012	Hanlon et al.	
	121	8328434	12-11-2012	Wang et al.	
	122	RE49287	11-08-2022	Tsai (Filed 09-14-2020)	
	123	2003/0100203	05-29-2003	Yen	
	124	2003/0171035	09-11-2003	Yoo	
	125	2004/0023559	02-05-2004	Wu	
	126	2004/0023560	02-05-2004	Swoboda	
	127	2004/0103228	05-27-2004	Kao	
	128	2004/0115990	06-17-2004	Kodama	
	129	2005/0079738	04-14-2005	Ahn	
	130	2005/0124218	06-09-2005	Chen et al.	
	131	2005/0186810	08-25-2005	Sardella et al.	
	132	2005/0186850	08-25-2005	Tsai	
	133	2006/0024997	02-02-2006	Teicher	
	134	2006/0056401	03-16-2006	Bohm et al.	
	135	2006/0094301	05-04-2006	Lee et al.	
	136	2006/0183371	08-17-2006	Tsai	
	137	2007/0010115	01-11-2007	Teicher	
	138	2007/0049115	03-01-2007	Igarashi et al.	
	139	2007/0058332	03-15-2007	Canterbury et al.	
	140	2007/0072491	03-29-2007	Huang	
	141	2007/0173129	07-26-2007	Han	
	142	2007/0197053	08-23-2007	Liao	
	143	2007/0202725	08-30-2007	Teicher	
	144	2007/0202750	08-30-2007	Nishiwaki et al.	
	145	2007/0243726	10-18-2007	Trenne et al.	
	146	2007/0281524	12-06-2007	Pomerantz	
	147	2007/0300023	12-27-2007	Cronin et al.	
	148	2008/0030963	02-07-2008	Middlekauff et al.	
	149	2008/0064271	03-13-2008	Hiew et al.	
	150	2008/0067248	03-20-2008	Hiew et al.	
	151	2008/0119076	05-22-2008	Teicher	

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	5	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	152	2008/0130207	06-05-2008	Schmidt	
	153	2008/0200072	08-21-2008	Cheong	
	154	2008/0218799	09-11-2008	Hiew et al.	
	155	2008/0242149	10-02-2008	Konno et al.	
	156	2008/0254680	10-16-2008	Chiu et al.	
	157	2008/0274633	11-06-2008	Teicher	
	158	2008/0299833	12-04-2008	Abe	
	159	2008/0305651	12-11-2008	Mostoller et al.	
	160	2008/0311781	12-18-2008	Wojcik et al.	
	161	2009/0011621	01-08-2009	Trenne	
	162	2009/0017683	01-15-2009	Lin	
	163	2009/0042421	02-12-2009	Zheng et al.	
	164	2009/0156055	06-18-2009	Park et al.	
	165	2009/0176386	07-09-2009	Wu	
	166	2009/0258539	10-15-2009	Zheng et al.	
	167	2009/0318026	12-24-2009	Yi et al.	
	168	2010/0075517	03-25-2010	Ni et al.	
	169	2010/0081337	04-01-2010	Dorogusker et al.	
	170	2010/0190382	07-29-2010	Szini et al.	
	171	2010/0221936	09-02-2010	Zhao et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document Country Code ³ ; Number ⁴ ; Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
	172	CN 1370343 A	09-18-2002	BRAUN GMBH		(Includes an English Translation of the Abstract)
	173	CN 2616942 Y	05-19-2004	LUO XIUQUN		(Includes an English Translation of the Abstract)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Complete if Known	
				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	6	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	174	CN 2653739 Y	11-03-2004	SHIHUA ELECTRONIC CO LTD DONGG		(Includes an English Translation of the Abstract)
	175	CN 2682675 Y	03-02-2005	FOXCONN KUNSHAN COMP INTERFACE		(Includes an English Translation of the Abstract and believed to correspond to US Publication No. 2005/0124218 cited herein)
	176	CN 2728025 Y	09-21-2005	FOXCONN KUNSHAN COMP INTERFACE		(Includes an English Translation of the Abstract and believed to correspond to US Patent No. 6,971,915 cited herein)
	177	CN 2682604 Y	03-02-2005	INVENTECH MULTIMEDIA & TELECOM		(Includes an English Translation of the Abstract)
	178	CN 2682660 Y	03-02-2005	FOXCONN KUNSHAN COMP INTERFACE		(Includes an English Translation of the Abstract)
	179	CN 2733636 Y	10-12-2005	YAO LIHE		(Includes an English Translation of the Abstract)
	180	CN 1734857 A	02-15-2006	YAO LIHE		(Includes an English Translation of the Abstract)
	181	CN 2791923 Y	06-28-2006	ANGUO INTERNAT SCIENCE TECHNOL		(Includes an English Translation of the Abstract)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
-----------------------	---------------------	--------------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	7	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	182	CN 1830122 A	09-06-2006	SANDISK SECURE CONTENT SOLUTION		(Includes an English Translation of the Abstract and believed to correspond to International Publication No. WO 2005/013436 cited herein)
	183	CN 2884567 Y	03-28-2007	LIANZHAN SHENZHEN CO LTD		(Includes an English Translation of the Abstract)
	184	CN 1969428 A	05-23-2007	WALLETEX MICROELECTRONIC S LTD		(Includes an English Translation of the Abstract)
	185	CN 2909592 Y	06-06-2007	FOXCONN KUNSHAN COMP CONNECTOR		(Includes an English Translation of the Abstract)
	186	CN 101015096 A	08-08-2007	MSYSTEMS LTD		(Includes an English Translation of the Abstract)
	187	CN 101091292 A	12-19-2007	APPLE COMPUTER INC		(Includes an English Translation of the Abstract and believed to correspond to International Publication No. WO 2006/074348 A1 cited herein)
	188	CN 101103498 A	01-09-2008	THOMSON LICENSING CHIU RONALD		(Includes an English Translation of the Abstract)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
-----------------------	---------------------	--------------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Complete if Known	
				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	8	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	189	CN 101136524 A	03-05-2008	FOXCONN KUNSHAN COMP INTERFACE		(Includes an English Translation of the Abstract)
	190	CN 201038524 Y	03-19-2008	ZHENYU SUN		(Includes an English Translation of the Abstract)
	191	CN 201038533 A	03-19-2008	YUMING ZHANG		(Includes an English Translation of the Abstract)
	192	CN 101227046 A	07-23-2008	JIANCHENG LAI		(Includes an English Translation of the Abstract)
	193	CN 201113076 Y	09-10-2008	FOXCONN KUNSHAN COMP INTERFACE		(Includes an English Translation of the Abstract)
	194	CN 201113094 Y	09-10-2008	CHENG DAN		(Includes an English Translation of the Abstract)
	195	CN 201142484 Y	10-29-2008	KUNSHAN SHANGZHENG ELECTRONICS		(Includes an English Translation of the Abstract)
	196	CN 201369488 Y	12-23-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	197	CN 201160164 Y	12-03-2008	FOXCONN KUNSHAN COMP INTERFACE		(Includes an English Translation of the Abstract and believed to correspond to US Publication No. 2009/0176386 cited herein)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
-----------------------	---------------------	--------------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Complete if Known	
				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	9	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	198	CN 201181784 Y	01-14-2009	NING WU		(Includes an English Translation of the Abstract)
	199	CN 101364678 A	02-11-2009	FOXCONN KUNSHAN COMP INTERFACE		(Includes an English Translation of the Abstract)
	200	CN 201204298 Y	03-04-2009	FOXCONN KUNSHAN COMP CONNECTOR		(Includes an English Translation of the Abstract)
	201	CN 101419829 A	04-29-2009	ZHIDUOXING ELECTRONIC TECHNOLO		(Includes an English Translation of the Abstract)
	202	CN 201303129 Y	09-02-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	203	CN 201312013 Y	09-16-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	204	CN 201315398 Y	09-23-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	205	CN 201319419 Y	09-30-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	206	CN 201319420 Y	09-30-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	207	CN 101557059 A	10-14-2009	FOXCONN KUNSHAN COMP CONNECTOR		(Includes an English Translation of the Abstract)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	10	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	208	CN 201332168 Y	10-21-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	209	CN 201340920 Y	11-04-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	210	CN 201345463 Y	11-11-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	211	CN 201345464 Y	11-11-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	212	CN 201352641 Y	11-25-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	213	CN 201360013 Y	12-09-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	214	CN 201365045 Y	12-16-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	215	CN 201369403 Y	12-23-2009	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	216	CN 201374421 Y	12-30-2009	MOLEX INC		(Includes an English Translation of the Abstract)
	217	CN 201378641 Y	01-06-2010	BEIJING HUAQI INF DIGITAL SCI		(Includes an English Translation of the Abstract)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	11	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	218	CN 201402869 Y	02-10-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	219	CN 201402876 Y	02-10-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	220	CN 201413880 Y	02-24-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	221	CN 101677157 A	03-24-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	222	CN 101677158 A	03-24-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	223	CN 201440482 U	04-21-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	224	CN 201450136 U	05-05-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	225	CN 201450137 U	05-05-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	226	CN 201478488 U	05-19-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	227	CN 201478490 U	05-19-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	12	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	228	CN 201478491 U	05-19-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	229	CN 201478495 U	05-19-2010	INVENTEC CORP		(Includes an English Translation of the Abstract)
	230	CN 201478578 U	05-19-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	231	CN 201490374 U	05-26-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	232	CN 201490376 U	05-26-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	233	CN 201490377 U	05-26-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	234	CN 201498671 U	06-02-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	235	CN 101728722 A	06-09-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	236	CN 101728736 A	06-09-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	237	CN 201508936 U	06-16-2010	ZHENYA LIU		(Includes an English Translation of the Abstract)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFFEE
Sheet	13	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	238	CN 201515047 U	06-23-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	239	CN 201515048 U	06-23-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	240	CN 201515090 U	06-23-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	241	CN 201533031 U	07-21-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	242	CN 201540989 U	08-04-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	243	CN 201540991 U	08-04-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	244	CN 101800370 A	08-11-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	245	CN 201549671 U	08-11-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	246	CN 201562785 U	08-25-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	247	CN 201570618 U	09-01-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	14	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	248	CN 201594633 U	09-29-2010	HEMAO DONGGUAN ELECTRONIC & TECHNOLOGIES CO LTD		(Includes an English Translation of the Abstract)
	249	CN 101859936 A	10-13-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	250	CN 101877441 A	11-03-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	251	CN 101882716 A	11-10-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	252	CN 201656016 U	11-24-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	253	CN 201663252 U	12-01-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	254	CN 201663254 U	12-01-2010	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	255	CN 201682065 U	12-22-2010	APPLE INC		(Includes an English Translation of the Abstract)
	256	CN 201708282 U	01-12-2011	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	257	CN 201717389 U	01-19-2011	ZTE CORP		(Includes an English Translation of the Abstract)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
-----------------------	---------------------	--------------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	15	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	258	CN 102013587 A	04-13-2011	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	259	CN 102025052 A	04-20-2011	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	260	CN 201812961 U	04-27-2011	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	261	CN 201838763 U	05-18-2011	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	262	CN 202084669 U	12-21-2011	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	263	CN 202121098 U	01-18-2012	ZHOUXIAN CAI		(Includes an English Translation of the Abstract)
	264	DE 10034613 A1	01-31-2002	KOSTAL LEOPOLD GMBH & CO KG		(Includes an English Translation of the Abstract)
	265	JP 2003-217728 A	07-31-2003	FUJITSU LTD		(Includes an English Translation of the Abstract)
	266	JP 4035779 B2	01-23-2008	YO RITSUWA		(Includes an English Translation of the Abstract)
	267	JP 2008-508694 A	03-21-2008	TEICHER		(Includes an English Translation of the Abstract)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D/

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Complete if Known	
				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	16	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	268	JP 2008-210674 A	09-11-2008	KYOCERA CORP		(Includes an English Translation of the Abstract)
	269	JP 2008-300091A	12-11-2008	SANYO ELECTRIC CO		(Includes an English Translation of the Abstract)
	270	JP 2009-043717 A	02-26-2009	HON HAI PREC IND CO LTD		(Believed to correspond to US Publication No. 2009/0042421 cited herein)
	271	KR 10-2007-0039956 A	04-13-2007	MSYSTEMS LTD		(Includes an English Translation of the Abstract)
	272	TWM 253969 U	12-21-2004	INVENTEC MULTIMEDIA & TELECOM		(Includes a Machine Translation of the Description and Claims)
	273	WO 02/43192 A2	05-30-2002	ELECTRIC FUEL LTD		
	274	WO 2005/013436 A1	02-10-2005	MDRM INC		
	275	WO 2006/065681 A1	06-22-2006	MOLEX INC		
	276	WO 2006/074348 A1	07-13-2006	APPLE COMPUTER INC.		
	277	WO 2008/065659 A2	06-05-2008	WALLETEX MICROELECTRONICS LTD		
	278	WO 2008/121731 A1	10-09-2008	INTEL CORP		
	279	WO 2009/069969 A2	06-04-2009	LEE MOON KEY		

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/18/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.E.D/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFEE
Sheet	17	of	18	Attorney Docket Number	10186PAT-1-REI-CON

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No. ¹	
	280	"Cannon Trident Connectors," ITT Electronic Components, retrieved from https://www.ittcannon.com , 72 pages.
	281	"Department of Defense Interface Standard Aircraft/Store Electrical Interconnection System," Department of Defense, Report MIL-STD-1760E, Oct. 24, 2007, 219 pages.
	282	"Why are so many plugs (USB, HDMI, Ethernet) asymmetrical?," Post by u/boomybx on Reddit, 2014, retrieved from reddit.com/r/askscience/comments/1lsjfk/why_are_so_many_plugs_usb_hdmi_ethernet/ , 12 pages.
	283	SHANKLAND "Intel's Light Peak: One PC cable to rule them all," CNET, 2009, retrieved from https://www.cnet.com/news/intels-light-peak-one-pc-cable-to-rule-them-all/ , 4 pages.
	284	WILLINGTON, "Flipper USB Enables Upside-Down USB Connections," HotHardware, July 15, 2010, retrieved from https://hothardware.com/news/flipper-usb-enables-upside-down-usb-connections .
	285	Patent Registration Information and List of References cited by Examiner in German Patent Publication No. 102010014793.1, accurate as of Jul. 21, 2020, 2 pages.
	286	Patent Registration Information and List of References cited by Examiner in German Patent Publication No. 202010017854.1, accurate as of Jul. 21, 2020, 2 pages.
	287	Official Action (with English translation) for Japanese Patent Application No. 2010-091610, dated Jul. 12, 2010, 2 pages.
	288	Official Action (with English translation) for Japanese Patent Application No. 2012-002496, dated May 31, 2012, 4 pages.
	289	Official Action (with English translation) for Korean Patent Application No. 2010-0034310, dated Jul. 27, 2011, 4 pages.
	290	Official Action (with English translation) for Korean Patent Application No. 2010-0034310, dated Nov. 30, 2011, 4 pages.
	291	Official Action (with English translation) for Korean Patent Application No. 2010-0034310, dated May 18, 2012, 2 pages.
	292	Unpublished Taiwanese Patent Application No. 098142573 (no English translation available), filed Apr. 15, 2009, 25 pages.

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/20/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/974,866
				Filing Date	October 27, 2022
				First Named Inventor	Chou Hsien Tsai
				Art Unit	3992
				Examiner Name	JAMES A MENEFE
Sheet	18	of	18	Attorney Docket Number	10186PAT-1-REI-CON

	293	Unpublished Taiwanese Patent Application No. 098117405 (no English translation available), filed May 26, 2009, 38 pages.
	294	Unpublished Taiwanese Patent Application No. 099100847 (no English translation available), filed Jan. 13, 2010, 53 pages.
	295	Bibliographic Data and Prosecution History (with English mechanical translation) for Taiwanese Patent Application No. 098210021, first published Jun. 5, 2009, 17 pages.
	296	Bibliographic Data and Prosecution History (with English mechanical translation) for Taiwanese Patent Application No. 099108987, first published Oct. 16, 2010, 107 pages.
	297	Bibliographic Data and Prosecution History (with English mechanical translation) for Taiwanese Patent Application No. 099224051, first published Nov. 11, 2011, 150 pages.
	298	Bibliographic Data and Prosecution History (with English mechanical translation) for Taiwanese Patent Application No. 100203503, first published Nov. 11, 2011, 69 pages.
	299	Bibliographic Data and Prosecution History (with English mechanical translation) for Taiwanese Patent Application No. 099225602, first published Apr. 1, 2012, 78 pages.
	300	Bibliographic Data and Prosecution History (with English mechanical translation) for Taiwanese Patent Application No. 101208435, first published Dec. 11, 2012, 116 pages.
	301	Official Action for U.S. Patent Application No. 12/759,408, dated Oct. 17, 2011 (Attorney Ref. No. 10186PAT-1), 5 pages. RESTRICTION REQUIREMENT.
	302	Official Action for U.S. Patent Application No. 12/759,408, dated Dec. 7, 2011 (Attorney Ref. No. 10186PAT-1), 11 pages.
	303	Notice of Allowance for U.S. Patent Application No. 12/759,408, dated Mar. 16, 2012 (Attorney Ref. No. 10186PAT-1), 6 pages.
	304	Office Action for US Application No. 17/020,359, mailed January 11, 2022 (Attorney Ref. No. 10186PAT-1-REI)
	305	Notice of Allowance for US Application No. 17/020,359, mailed August 17, 2022 (Attorney Ref. No. 10186PAT-1-REI)

Examiner Signature	/WILLIAM E DONDERO/	Date Considered	06/20/2024
--------------------	---------------------	-----------------	------------

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L2	2	"8198563".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/10 10:02 AM
L3	1	RE49287.pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/10 10:04 AM
L4	14	("4253719" OR "4258969" OR "4421371" OR "5135406" OR "5293013" OR "5496186" OR "5518416" OR "5772448" OR "6095861" OR "6127941" OR "6132223" OR "6132254" OR "6190190" OR "6257930").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:28 AM
L5	19	(US-3795037-\$ US-3808577-\$ US-3810258-\$ US-4537459-\$ US-4700998-\$ US-4822303-\$ US-5295843-\$ US-5431578-\$ US-5445528-\$ US-5542850-\$ US-5591050-\$ US-5595503-\$ US-5644470-\$ US-5773901-\$ US-5800220-\$ US-5941728-\$ US-6033247-\$ US-6074225-\$ US-6352450-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:29 AM
L6	19	(US-3795037-\$ US-3808577-\$ US-3810258-\$ US-4537459-\$ US-4700998-\$ US-4822303-\$ US-5295843-\$ US-5431578-\$ US-5445528-\$ US-5542850-\$ US-5591050-\$ US-5595503-\$ US-	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:33 AM

L7	15	5644470-\$ US- 5773901-\$ US- 5800220-\$ US- 5941729-\$ US- 6033247-\$ US- 6074225-\$ US- 6352450-\$).DID. ("4253719" OR "4258969" OR "4421371" OR "5135406" OR "5293013" OR "5496186" OR "5518416" OR "5772448" OR "6095861" OR "6127941" OR "6132223" OR "6132254" OR "6190190" OR "6257930" OR "5964610").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:34 AM
L8	34	L6 OR L7	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 08:36 AM
L10	17	("6364699" OR "6530793" OR "6565366" OR "6609928" OR "6744634" OR "6854984" OR "6901457" OR "6971915" OR "6981887" OR "7001201" OR "7059914" OR "7090541" OR "7150651" OR "7165998" OR "7198522" OR "7249978" OR "7269004").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:18 PM
L11	22	(US-6394813-\$ US- 6417718-\$ US- 6461192-\$ US- 6544075-\$ US- 6599152-\$ US- 6792487-\$ US- 6796844-\$ US- 6840806-\$ US- 6887108-\$ US- 6948983-\$ US- 6962510-\$ US- 6964582-\$ US- 6991483-\$ US- 7001192-\$ US- 7037120-\$ US-	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:20 PM

L12	73	7094086-\$ US-7094089-\$ US-7155545-\$ US-7160125-\$ US-7182646-\$ US-7275940-\$ US-7300320-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:21 PM
L13	17	("7314383" OR "7318752" OR "7341458" OR "7347747" OR "7359208" OR "7361059" OR "7363947" OR "7387539" OR "7402086" OR "7467977" OR "7572153" OR "7604512" OR "7628619" OR "7635280" OR "7670156" OR "7710736" OR "7740499").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:48 PM
L14	21	(US-7329128-\$ US-7352601-\$ US-7354314-\$ US-7407390-\$ US-7416413-\$ US-7440286-\$ US-7458825-\$ US-7462071-\$ US-7465181-\$ US-7470160-\$ US-7500861-\$ US-7517253-\$ US-7547218-\$ US-7553172-\$ US-7591657-\$ US-7601034-\$ US-7628655-\$ US-7641519-\$ US-7654871-\$ US-7682169-\$ US-7731535-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:48 PM
L15	18	("7314383" OR "7318752" OR "7341458" OR "7347747" OR "7359208" OR "7361059" OR "7363947" OR "7387539" OR "7402086" OR	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 02:54 PM

		"7467977" OR "7572153" OR "7604512" OR "7628619" OR "7635280" OR "7670156" OR "7710736" OR "7740499" OR "7440287").pn.					
L16	112	L12 OR L14 OR L15	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:01 PM
L17	2	("7918689" OR RE49287).pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:16 PM
L18	8	(US-8043699-\$ US- 8073985-\$ US- 8079879-\$ US- 8167638-\$ US- 8198563-\$ US- 8241047-\$ US- 8257287-\$ US- 8328434-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:17 PM
L19	122	L16 OR L17 OR L18	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:17 PM
L20	18	("20030100203" OR "20030171035" OR "20040023560" OR "20040103228" OR "20040115990" OR "20050186810" OR "20060024997" OR "20060056401" OR "20060094301" OR "20060183371" OR "20070049115" OR "20070072491" OR "20070173129" OR "20070281524" OR "20080030963" OR "20080064271" OR "20080067248" OR "20080119076").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:32 PM
L21	10	(US-20040023559-\$ US-20050079738-\$ US-20050124218-\$ US-20070010115-\$ US-20070058332-\$ US-20070197053-\$ US-20070202725-\$ US-20070202750-\$ US-20070243726-\$ US-20070300023-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:32 PM
L23	19	("20030100203" OR "20030171035" OR "20040023560" OR	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:37 PM

L24	151	"20040103228" OR "20040115990" OR "20050186810" OR "20060024997" OR "20060056401" OR "20060094301" OR "20060183371" OR "20070049115" OR "20070072491" OR "20070173129" OR "20070281524" OR "20080030963" OR "20080064271" OR "20080067248" OR "20080119076" OR "20050186850").pn. L19 OR L21 OR L23	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:38 PM
L25	11	("20080130207" OR "20080218799" OR "20080274633" OR "20080305651" OR "20080311781" OR "200960011621" OR "20090017683" OR "20090156055" OR "20090176386" OR "20090318026" OR "20100075517" OR "20100190382" OR "2010221936").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:48 PM
L26	7	(US-20080200072-\$ US-20080242149-\$ US-20080254680-\$ US-20080299833-\$ US-20090258539-\$ US-20090042421-\$ US-20100081337-\$).DID.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:49 PM
L27	18	L25 OR L26	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:58 PM
L28	1	"20100221936".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 03:59 PM
L29	19	L27 OR L28	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:00 PM
L30	1	"20090011621".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:01 PM
L31	20	L29 OR L30	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:01 PM
L32	171	L24 OR L31	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/13 04:02 PM
L33	3	"20060024997".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/17 11:48 AM

L34	2	"20090258539".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/17 11:59 AM
L35	3	((("KIWI") near3 ("CONNECTION") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2024/06/20 03:28 PM
L36	10	((("KIWI") near3 ("CONNECTION") near3 ("LLC"))).AS,AANM.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/20 03:28 PM
L37	87	((("TSAI") near3 ("Chou") near3 ("Hsien"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 03:29 PM
L38	221	((("TSAI") near3 ("Chou") near3 ("Hsien"))).INV.	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/06/20 03:29 PM
L39	7645	H01R29/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:02 PM
L40	10263	H01R27/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:02 PM
L41	9599	H01R12/58.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:02 PM
L42	26781	H01R12/716.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:03 PM
L43	5076	H01R13/658.cpc.	(US-PGPUB; USPAT;	OR	ON	ON	2024/06/20

L44	3929	H01R13/642.cpc.	USOCR; FPRS; EPO; JPO; DERWENT) (US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	04:03 PM 2024/06/20 04:03 PM
L45	14652	H01R13/64.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:03 PM
L46	2143	H05K5/0278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:04 PM
L47	6247	G06K19/07732.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/06/20 04:04 PM
L48	80165	L39 OR L40 OR L41 OR L42 OR L43 OR L44 OR L45 OR L46 OR L47	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:28 AM
L53	14	L48 AND (socket SAME tongue SAME reversible)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:30 AM
L54	109	L48 AND (socket SAME tongue SAME ((two OR mutiple OR plural) WITH plug\$1))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:35 AM
L55	33	(Artificial Intelligence) More like doc: US-20120015561-A1 Text: (US-9142926-B2 OR US-10074947-B2 OR US-20150288115-A1 OR US-20190006798-A1 OR US-20190006799-A1 OR US-10680393-B2 OR US-20190006800-A1 OR US-11600959-B2 OR US-20210242642-A1 OR US-10826254-B2 OR US-10559932-B2 OR US-RE49287-E OR US-20100267282-A1 OR US-9178310-B2 OR US-20130005193-A1 OR US-20170279226-A1 OR US-10297954-B2 OR US-20100279520-A1 OR US-10680384-B2 OR CN-102340069-A).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/01 10:41 AM
L56	32	L48 AND (socket AND tongue AND reversible)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:46 AM

L57	317	L48 AND (socket AND tongue AND ((two OR multiple OR plural) WITH plug\$1))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:49 AM
L58	208	L57 NOT L54	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 10:49 AM
L59	4	WO-2009069969-\$.did.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 11:04 AM
L60	4	"7160125".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 11:06 AM
L61	3	"20060024997".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 11:35 AM
L62	3	L2 OR L3	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 01:20 PM
L63	3	L62 AND height	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 01:20 PM
L64	3	L62 AND simultaneously	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 01:34 PM
L65	11	((US-8198563-B2 OR US-7361059-B2 OR US-6981887-B1 OR US-RE49287-E OR US-7160125-B1).did. AND USPT.dbnm.) OR ((US-20090156055-A1 OR US-20060024997-A1 OR US-20100221936-A1).did. AND PGPB.dbnm.) OR ((WO-2009069969-A2).did. AND EPAB.dbnm.) OR ((US-7160125-B1 OR US-20060024997-A1).did. AND DWPI.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/01 01:51 PM
L66	5	L65 AND metal\$3	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/07/01 01:51 PM
L67	3	L62 AND metal	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR,	OR	ON	ON	2024/07/01 01:52 PM

L68	3	"7361059".pn.	GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT)	OR	ON	ON	2024/07/01 02:01 PM
-----	---	---------------	--	----	----	----	------------------------

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Litigation Search Report CRU 3999

Reexamination Control No. 17/974,866

To:	Examiner Dondero	From:	B. Harden, Paralegal
Location:	OCRU	Location:	OCRU
Art Unit:	3993	Phone:	7037561815
Date:	<u>14 June 2024</u>	E-mail:	brian.harden@uspto.gov

Search Notes

NO LITIGATION WAS FOUND

1. Performed a KeyCite Search in Westlaw, which retrieves all history on the patent including any litigation.
2. Performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.
3. Performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.
4. Performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.
5. Performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
4 June 2009 (04.06.2009)

PCT

(10) International Publication Number
WO 2009/069969 A2

(51) International Patent Classification:
H01R 12/16 (2006.01)

(21) International Application Number:
PCT/KR2008/007050

(22) International Filing Date:
30 November 2008 (30.11.2008)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
10-2007-0124034 30 November 2007 (30.11.2007) KR
10-2007-0124068 2 December 2007 (02.12.2007) KR
10-2007-0127269 10 December 2007 (10.12.2007) KR
10-2008-0012013 8 February 2008 (08.02.2008) KR
10-2008-0012016 9 February 2008 (09.02.2008) KR
10-2008-0120202 29 November 2008 (29.11.2008) KR

(71) Applicant and

(72) Inventor: LEE, moon key [KR/KR]; Me Sung APT.6-309, Bulgwang 1 dong, Eun Pyeong Gu, Seoul 122-751 (KR).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report*



WO 2009/069969 A2

(54) Title: A TYPE SYMMETRIC USB RECEPTACLE

(57) Abstract: The present invention relates to the symmetric A type usb receptacle which is easily connected with usb plug regardless of the relative orientation of the receptacle and plug. This is achieved by adding electrical contacts symmetrically and electronic sensor circuit which can detect the relative orientation of the receptacle and plug. The sensor circuit contains microcontroller and analog multiplexer to route the usb signal path. The present invention contains symmetric contact portion, sensor portion to detect which surface of the symmetric contact portion is connected to the usb plug, the control portion to route the usb signal path through the detected contacts.

Description

A TYPE USB RECEPTACLE

Technical Field

- [1] The present invention relates to the A type USB receptacle. The cross section of A type usb plug of usb peripheral device is rectangle and it is difficult to recognize the direction of the rectangle by just touching so it is required to check the direction of it by looking at the cross section of the rectangle. But if there is no enough illumination or the receptacle is installed on the back of PC then we must watch the receptacle carefully with electric light and mirror. There is an invention(US 7,160,125 B1, reversible universal serial bus (usb) device and connector) to solve this problem, But said US invention contains mechanical part (which is wearable and unstable due to vibration or mechanical shock) to detect the orientation of plug.

Disclosure of Invention

Technical Problem

- [2] The object of present invention is to provide A type usb receptacle which is pluggable regardless of the orientation of the usb plug

Technical Solution

- [3] The above object of present invention can be achieved by adding the electrical contacts symmetrically and sensor circuit to usb A type receptacle.
- [4]

Advantageous Effects

- [5] A type USB plug can be easily and instantly connected with the receptacle of present invention regardless of the orientation of plug so it can be used for children, elders or blind person. And it can be used for the computer of emergency room or military.
- [6]

Brief Description of Drawings

- [7] Fig.1 is the side view of the conventional A type usb receptacle and usb plug
- [8] Fig.2 is the side view of the A type usb symmetrical receptacle of present invention.
- [9] Fig.3 is the perspective view of Fig.2.
- [10] Fig.4 is the front view of the A type usb symmetrical receptacle.
- [11] Fig.5 is the composition diagram of present invention.
- [12] Fig.6 is more specific diagram of Fig.5.
- [13] Fig.7 is the flow chart of microcontroller.
- [14] Fig.8 is the example of circuit to measure the current.
- [15] Fig.9 is the A type usb symmetrical receptacle for usb3.0.
- [16]

- [17] <symbols in Drawings>
- [18] re : conventional A type usb receptacle
- [19] pg1,pg2,PG1,PG2 : A type usb plug
- [20] d,u : conducting terminals
- [21] c1,e1,e2 : conducting terminals of usb plug
- [22] rc : A type usb receptacle of present invention
- [23] cnt,cnt0,cnt1,cnt2 : circuit portion
- [24] cv : conducting sleeve of usb plug
- [25] mxu,mxd,mxp : analog multiplexer
- [26] cu,cd,cp : control signal
- [27] ssu,ssd : additional conducting terminal for usb3.0
- [28]

Best Mode for Carrying out the Invention

- [29] embodiment1
- [30] Fig.1 is the side view of the conventional usb receptacle (re) and the usb plugs(pg1,pg2). The 1st plug (pg1) can be connected to the receptacle (re) but the 2nd plug (pg2) can not be connected because its orientation is not aligned to the receptacle. In other words, the 2nd plug(pg2) must be rotated by 180 degree in order to align its orientation to the receptacle(re). The conducting terminals(c1) of the 1st plug(pg1) connected to the receptacle (re) touches with the conducting terminals(d) of the receptacle(re). The conducting terminals(d) of the receptacle(re) are connected to the host controller of circuit of PC and the conducting terminals(c1) of plug(pg1) are connected to the peripheral device.
- [31] The Fig.2 is the side view of receptacle(rc) of present invention. Fig.2 shows the conducting terminals(u) on the upper side and the conducting terminals(d) on the lower side of the receptacle(re).It means that the plugs (PG1, PG2) can be connected regardless of its orientation(0 and 180 degree rotated states of plug are equal orientation with respect to the receptacle of present invention). In Fig.2, if the plugs(PG1,PG2) are connected to the receptacle(rc) then the conducting terminals(e1) of the 1st plug (PG1) touches with the conducting terminals(d) of the lower side of the receptacle (rc) and the conducting terminals(e2) of the 2nd plug (PG2) touches with the conducting terminals(u) of the upper side of the receptacle (rc)
- [32] The Fig.3 is the perspective view of receptacle(rc) and the 1st plug(PG1) of Fig2 and the Fig.4 is the front view of the receptacle(rc) of Fig.2. In Fig.4, the conducting terminals of upper side and the lower side are symmetric with respect to the 180 degree rotation In Fig.4, '_u' and '_d' represent the upper and lower side respectively. For example, D-_u, D-_u represent D- terminal of lower side and D- terminal of upper side

respectively.

- [33] Fig.5 shows the composition of symmetric receptacle of present invention. As shown in Fig.5, the symmetric receptacle of present invention includes
- [34] the upper surface portion (including upper conducting terminals GND_u,D+_u,D-_u,Vbus_u),
- [35] lower surface portion (including lower conducting terminals GND_d,D+_d,D-_d,Vbus_d),
- [36] and circuit portion(cnt)(including sensor portion,analog multiplexers, and control portion).
- [37] The sensor portion detects which side (upper side or lower side of the symmetric receptacle) touches the conducting terminal of usb plug. The control portion controls the sensor portion and analog multiplexers so that the usb signal can flow through the touching side of the symmetric receptacle.
- [38] The circuit portion(cnt) can be installed on the PCB near to the host controller or installed inside of the receptacle module(rc) as shown cnt1 in Fig.2. It is also possible to install the circuit portion(cnt) inside of the host controller as shown cnt0 in Fig.2. In other words, the location of the circuit portion is not restricted.
- [39] The Fig.6 is the more specific description of Fig.5. In Fig.6, the circuit portion(cnt) includes the microcontroller or sequential circuit(mic) and the analog multiplexers (mxu,mxd,mxp). The analog multiplexers are classified as following:
- [40] the upper analog multiplexer(mxu) connected to the conducting terminal(u) on the upper side of receptacle;
- [41] the lower analog multiplexer(mxd) connected to the conducting terminal(d) on the lower side of receptacle; and
- [42] the host analog multiplexer(mxp) connected to host controller.
- [43]
- [44] The lines(d,u,p) in Fig.6 represent the set of 4 conducting terminals (GND,D-,D+,Vbus) of lower side ,upper side and host controller respectively. The power supply for microcontroller(mic) and the analog multiplexers can be utilized from the independent power or the usb power(GND,Vbus).
- [45] The microcontroller(mic) outputs the control signal(cu,cd) to the analog multiplexers(mxu, mxd) on order to connect the conducting terminal of upper or lower side of receptacle to I/O ports of microcontroller and recognize which side of receptacle is connected to the conducting terminals of usb plug by outputting the test signal and reading signal from its input ports. If the recognition is successful then the microcontroller outputs the control signals (cu,cd,cp)to the analog multiplexers(mxu, mxd ,mxp) in order to connect the touching side of receptacle to the host controller.
- [46] Some usb peripheral device like memory stick has no conducting sleeve (cv in Fig.2

and Fing.3) and some usb peripheral device like electric fan has dummy D-, D+ terminal (dummy terminal means the terminal isolated from circuit). Therefore The state of conducting terminals of upper or lower side of the symmetric receptacle is one of the following 4 states:

[47]

[48] Table 1

[Table 1]

[Table]

State	State id
Nothing is touching the conducting terminals of the receptacle	T0
Conducting sleeve(cv) of usb plug is touching the conducting terminals of the receptacle. (the conducting terminals are shorted each other by the conducting sleeve)	T1
Conducting terminals of usb plug with dummy D+ and D- terminal is touching the conducting terminals of the receptacle.	T2
Conducting terminals of ordinary usb plug (ordinary means that the D+, D- terminals are not dummy ones) is touching the conducting terminals receptacle	T3

[49]

[50]

[51] Therefore the combination of the 2 states of the upper and lower side of the symmetric receptacle is one of the following:

[52]

[53] Table 2

[Table 2]

[Table]

State of upper side state of lower side	T0	T1	T2	T3
T0	S0	X	S1	S2
T1	X	X	S3	S4
T2	S5	S6	X	X
T3	S7	S8	X	X

[54]

[55] The states S0~S8 in the above table 2 represent possible state and 'X' represent

impossible state. For example, S0 represents the state in which any usb plug is not connected and S4 represents the state in which the state of upper side of receptacle is T3 and the state of lower side of receptacle is T1.(i.e., upper side is touching the conducting terminals of usb plug and the lower side is touching the conducting sleeve of usb plug) The correspondence between the operation of microcontroller and the state of the receptacle is following:

[56]

[57]

Table 3

[Table 3]

[Table]

State of Lower side	State of upper side	State of symmetric receptacle	Summary of state	Operation of micro-controller
T0	T0	S0	No plug is connected to the receptacle	Continue to check whether the plug is connected
T0	T2	S1	Upper side of receptacle is touching the conducting terminals of usb plug	Connect the conducting terminals of the upper side of receptacle to the host controller.
T0	T3	S2		
T1	T2	S3		
T1	T3	S4		
T2	T0	S5	lower side of receptacle is touching the conducting terminals of usb plug	Connect the conducting terminals of the lower side of receptacle to the host controller.
T2	T1	S6		
T3	T0	S7		
T3	T1	S8		

[58]

Fig.7 shows the flow chart of microcontroller(mic) of circuit portion (cnt). The detail step number and its description of the flow chart with the symbols in Fig.6 is following:

[59]

[60]

(1)microcontroller outputs control signal(cu,cd,cp) to analog multiplexers(mxu,mxd,mxp) to disconnect the connection between the host controller and the conducting terminals of receptacle and goes to step(2)

[61]

(2) microcontroller outputs control signal(cu,cd)to analog multiplexers (mxu,mxd) to connect the conducting terminals of upper side of receptacle with the I/O ports of microcontroller and outputs the test signal to the output ports of microcontroller and reads signal from the input ports of microcontroller and recognize the state of the upper side

of receptacle by interpreting the read signal and goes to the step(3).(It is recommended to read analog voltage from the input port and convert the read value with a analog digital converter.)

- [62] (3)microcontroller outputs the control signal (cu.cd) to analog multiplexers (mxu,mxd) to connect the conducting terminals of lower side of receptacle with the I/O ports of microcontroller and outputs the test signal to the output ports and reads signal from the input ports and recognizes the state of the lower side of receptacle by interpreting the read signal and goes to the step(4).
- [63] (4)Find the state(S0~S8 in Table3) of receptacle from the states of each side of receptacle(T0~T3) determined by the above step(2) and (3) and find the operation which is assigned to the found state by the table 3 and executes the found operation.
- [64] In other words, If an usb plug is connected with the receptacle then microcontroller outputs the control signal(cu.cd,cp) to the analog multiplexers to connect the conducting terminals of usb plug with the host controller and goes to the step(5).
- [65] If no ubs plug is connected with the receptacle then goes to step(2) and readptes the above steps.
- [66] (5)Check whether the usb plug is disconnected from the receptacle. If the plug is disconnected then goes back to the step(1) and repeats the above steps. If the plug is not disconnected then repeats the step(5).
- [67]
- [68] The disconnection between the usb plug and the receptacle can be detected by measuring the current through the power pin(Vbus). If the measured current is 0 then disconnection is happened. Fig.8 shows an example of the circuit to measure the current. There is a small resistor(R) between the power pin(p1) of host controller and the power pin(u1) of usb plug and the voltage drop between 2 pins(u1,p1) is propersional to the current through the resistor(R).
- [69]
- [70] In the above step(2) and (3), the method to recognize the state of upper (or lower) side of receptacle is following:
- [71] The microcontroller outputs control signal(cu) to analog multiplexer (mxu) to connect power pin (Vbus_u) of upper side of receptacle with the output port of microcontroller(mic) and to connect ground pin(GND_u) of upper side of receptacle with the input port of microcontroller(mic) where the input port of microcontroller is recommended to be connected with ground with pull down resistor. And the mic ro-controller outputs 5 volt or 3 volt.(this 5 or 3 volt is an example of logic high(1)) and reads the voltage from input port. It is recommended to read analog voltage value with analog digital converter in order to read more accurate voltage value.
- [72] If the read voltage is 0 then there is nothing touching the conducting terminals of the

receptacle and this state is T0 in table1.

- [73] If the read voltage is positive then conducting sleeve or conducting terminals of usb plug is touching the conducting terminals of receptacle. (the positive read voltage means that the power pin of upper side of receptacle is connected to the ground pin of upper side of receptacle through the conducting sleeve or the circuit of usb plug) This state is one among T1, T2, T3 in table 1. The method to determine the state from T1,T2,T3 is following:
- [74]
- [75] The microcontroller outputs control signal(cu) to analog multiplexer (mxu) to connect power pin (Vbus_u) and ground pin(GND_u) of upper side of receptacle with the output ports of microcontroller(mic) respectively and to connect usb data pins(D+_u,D-_u) with the input ports of microcontroller (mic) respectively. The input ports of microcontroller(mic) is recommended to be connected with the ground with pull down resistor. It is also recommended to insert small resistor between the ground pin(GND_u) and the output port of microcontroller.(This resistor prevents the short between the power pin(Vbus_u) and the ground pin(GND_u) if the conducting sleeve is plugged and touching them) Then the microcontroller outputs the 5 volt to the power pin(Vbus_u) and outputs 0 volt to the ground pin (GND_u)and read voltage from the usb data pins(D+_u,D-_u).
- [76] If the conducting sleeve is plugged then the read voltages are (positive and positive) because the usb data pins(D+_u,D-_u) are connected with the power pin(Vbus_u) through the conducting sleeve.
- [77] If read voltages are (0 and positive) or (positive and 0) then the ordinary usb peripheral device is plugged to the receptacle.(ubs specification document has it that the usb peripheral device must outputs (0 volt and 3.3 volt) or (3.3 volt and 0 volt) through the data pins D+ and D- in order to inform its speed(low, full, high) to the host controller).
- [78] If the read voltages are (0 and 0) then the data pins(D+_u,D-_u) are isolated and it means that plugged usb peripheral has the dummy data pins like the electric fan. The summary is following:
- [79]
- [80] Table 4

[Table 4]

[Table]

State	read voltage from ground pin(GND_u) after outputting the 5 volt through power pin (VBus_u)	Read voltage from D+_u and D-_u after outputting 5 volt and 0 volt to VBus_u and GND_u respectively
T0 (nothing is plugged)	0	
T1 (conducting sleeve is plugged)	positive	(Positive, positive)
T2 (usb plug with dummy D+,D- pin is plugged)	Positive	(0,0)
T3 (ordinary ubs plug is plugged)	positive	(0 and positive) or (positive and 0)

[81]

[82] embodiment2

[83] There are 4 conducting terminals in usb 2.0 receptacle but 5 more terminals(1 for ground pin and 4 for data pins SSRX+, SSRX-, SSTX+, SSRX-) are added to the usb 3.0 receptacle. The symmetric receptacle of present invention can be used with the usb 3.0 peripheral device by adding 8 terminals symmetrically as shown in Fig.9. In other words, 4 terminals(ssu) are added on the upper side of receptacle and 4 terminals(ssd) are added on the lower side of receptacle symmetrically . By increasing the channel number of analog multiplexers from 4(VBus, D+,D-,GND) to 8 (VBus, D+,D-,GND, SSRX+, SSRX-, SSTX+, SSRX-), the symmetric receptacle of present invention can be used with the usb 3.0 device.

[84]

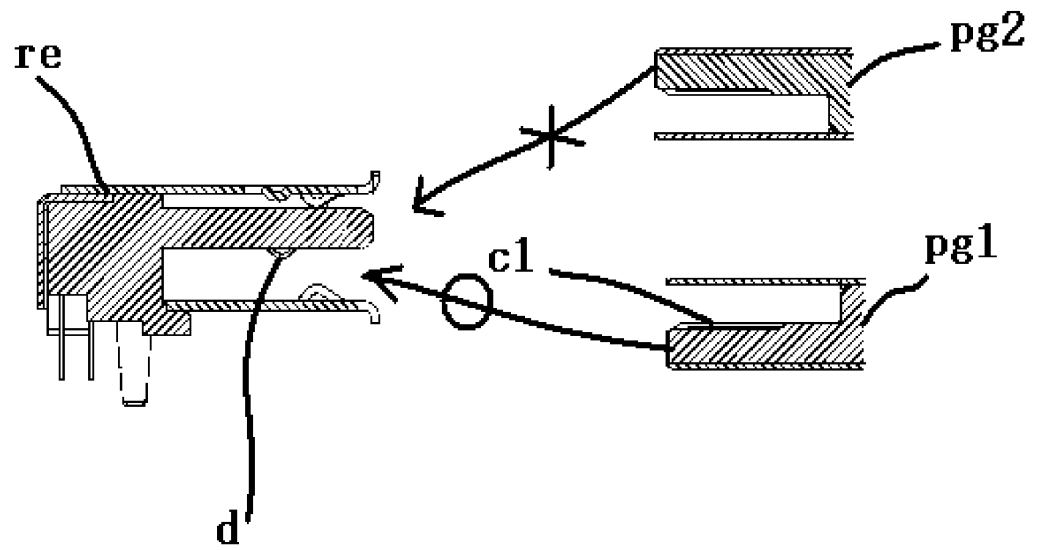
[85]

Claims

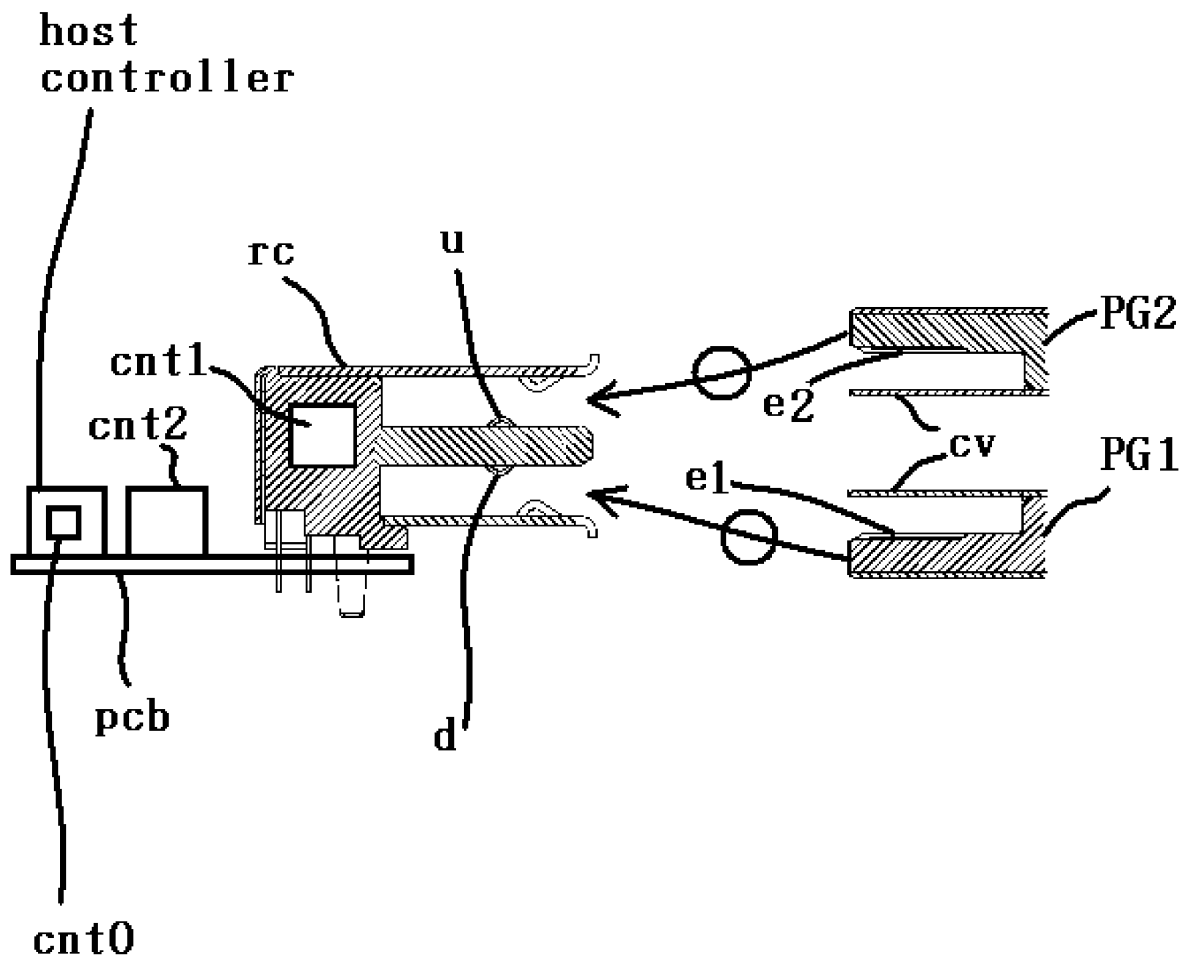
- [1] A type usb receptacle comprising:
an upper side portion having conducting terminals(Vbus,GND,D+,D-) of usb receptacle;
a lower side portion having conducting terminals(Vbus,GND,D+,D-) which is 180 degree rotationally symmetric to the upper side portion with respect to the center of receptacle;
a circuit portion recognizing the position of the usb plug and connecting the host controller with the usb plug.
- [2] A type usb receptacle comprising of claim 1, wherein said circuit portion comprising:
A microcontroller;
Analog multiplexers for controlling the connections among upper side portion, lower side portion, host controller, and microcontroller wherein the microcontroller recognizes the location of usb plug by outputting control signal to analog multiplexers ,outputting test signal to its output ports and reading voltage from its input ports.
- [3] A type usb receptacle comprising of claim 2, wherein said microcontroller has the operation flow chart in Fig.7.
- [4] A type usb receptacle comprising of claim 3, wherein said microcontroller of the step(2) or step(3) of flow chart of Fig.7,
The microcontroller recognizes the state of upper or lower side portion by outputting control signal(cu,cd) to analog multiplexers(mxu, mxd) to connect its I/O ports with the conducting terminals of one of the upper or lower side portion and
outputting test signal to its output ports and
reading its input ports
- [5] A type usb receptacle comprising of claim 3, wherein said microcontroller of the step(5) of flow chart of Fig.7,
The microcontroller detects the disconnection of usb plug by measuring the current through the power pin of upper or lower side portion.
- [6] A type usb receptacle comprising of claim 4, wherein said microcontroller recognizes the state in which nothing is touching the conducting terminals of upper or lower side portion if the measured voltage from the ground pin of one of upper or lower side portion is 0 where the measuring steps are as following:
Microcontroller outputs 5 volt to its output ports which is connected with the power pin of one of upper or lower side portion through analog multiplexer;

- Microcontroller read voltage from its input port which is connected to ground pin of one of upper or lower side portion where the ground pin is connected to ground with pull down resistor;
- [7] A type usb receptacle comprising of claim 4, wherein said microcontroller recognizes
- the state in which the conducting sleeve is touching the conducting terminals of one of upper or lower side portion and
- the other state in which conducting terminals of usb plug are touching the conducting terminals of one of upper or lower side portion
- by measuring the voltage from D+,D- pin of one of upper or lower side portion where the measuring and recognizing steps are as following:
- microcontroller outputs 5 volt to its output port which is connected with the power pin of one of upper or lower side portion through analog multiplexer;
- microcontroller outputs 0 volt to its output port which is connected with the ground pin of one of upper or lower side portion through analog multiplexer where the short protecting resistor is inserted between the output port and the ground pin;
- microcontroller reads voltage from its input ports which are connected to D+,D- pin of one of upper or lower side portion respectively where the input ports are connected to ground with pull down resistors;
- if the measured voltages are all positive then microcontroller recognizes that conducting sleeve of usb plug is touching the conducting terminals of one of upper or lower side portion and
- if the measured voltages are 0 and positive then microcontroller recognizes that conducting terminals of usb plug are touching the conducting terminals of one of upper or lower side portion
- [8] A type usb receptacle comprising of claim 1, wherein said conducting terminals include conducting terminals(SSRX+, SSRX-, SSTX+, SSRX-) which are added in usb 3.0.

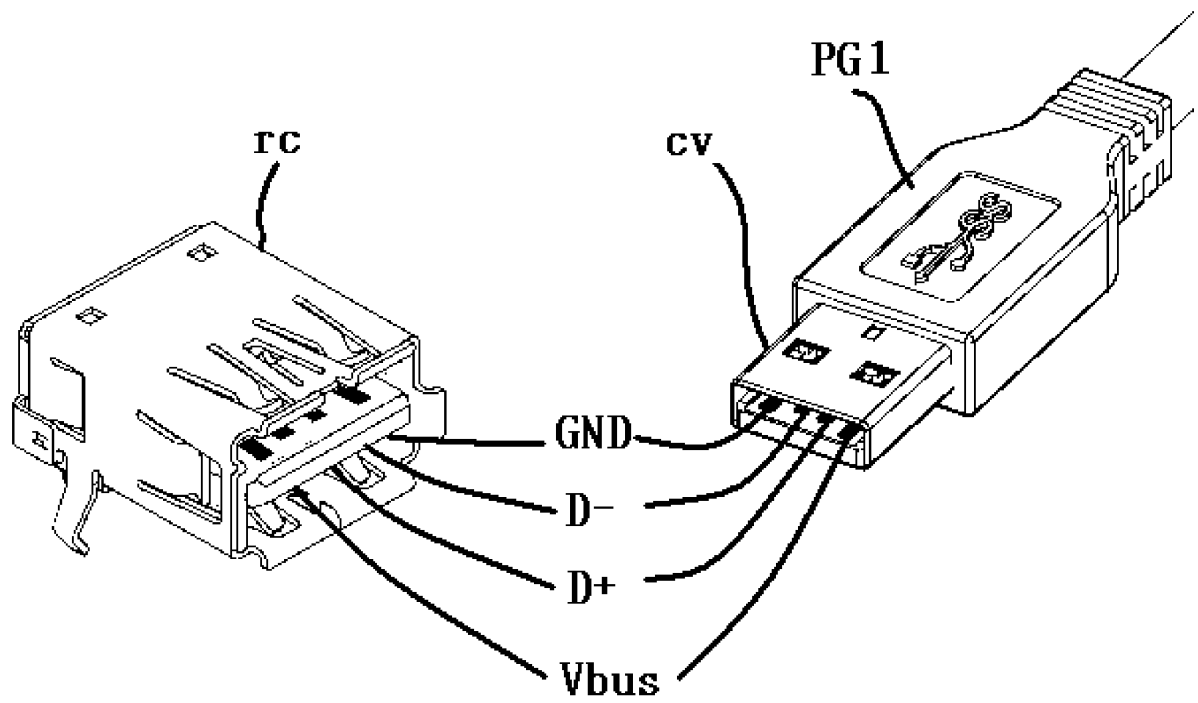
[Fig. 1]



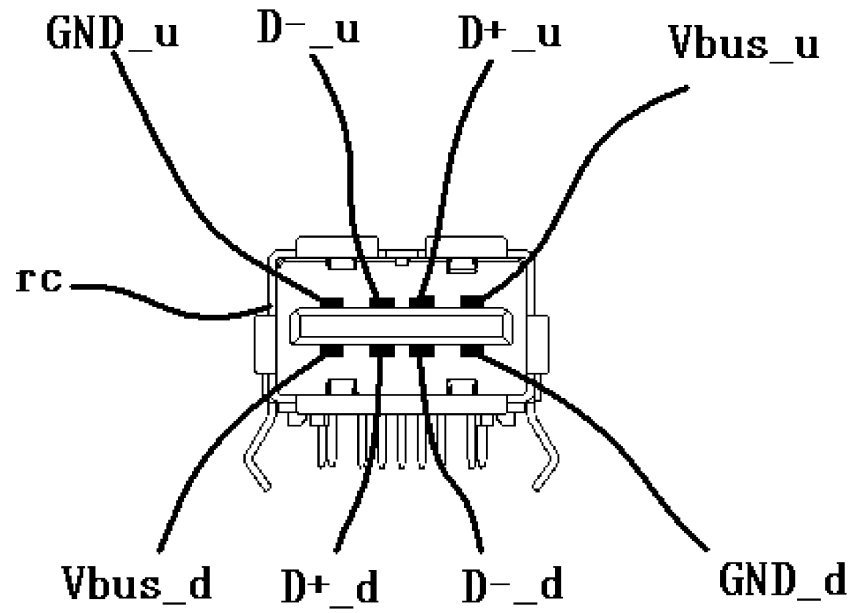
[Fig. 2]



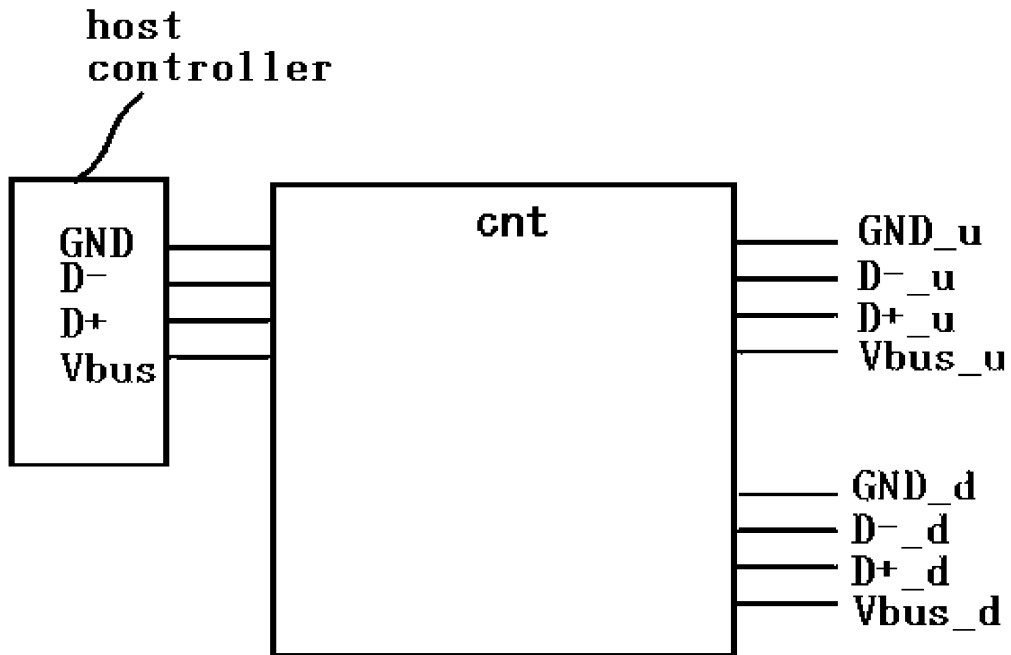
[Fig. 3]



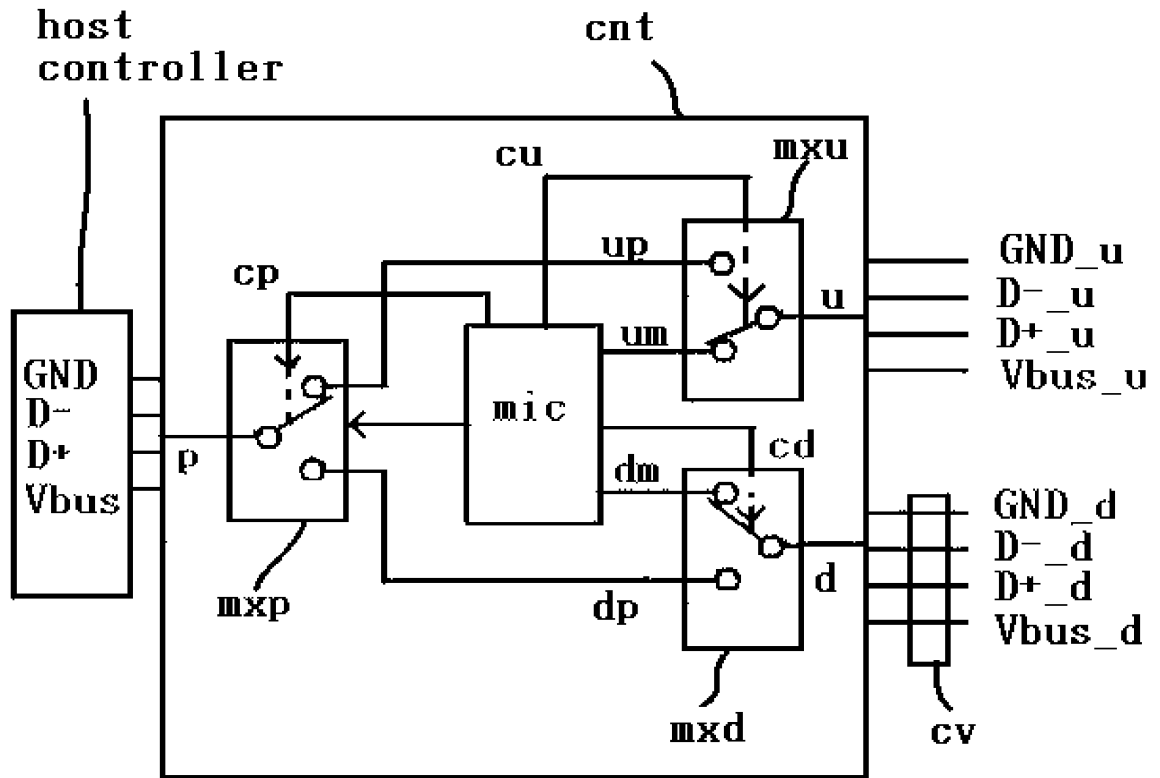
[Fig. 4]



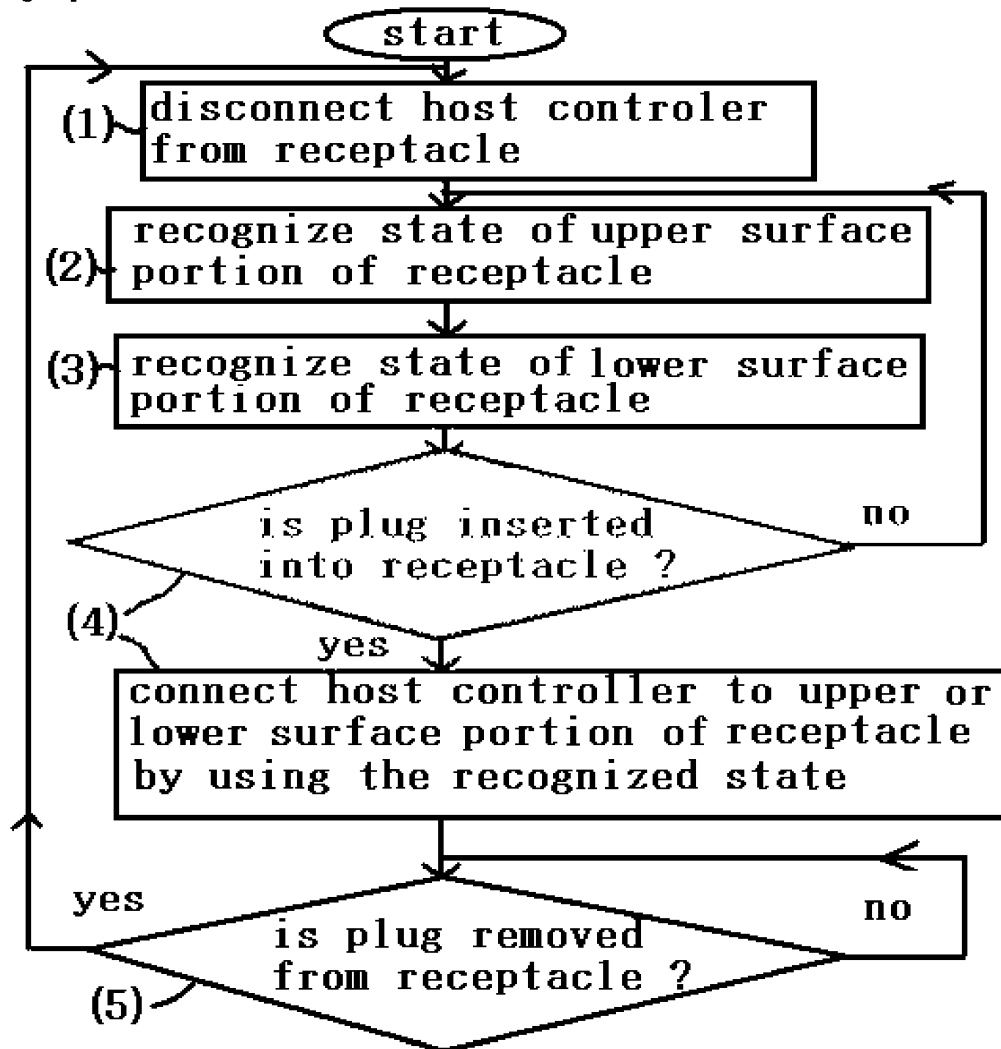
[Fig. 5]



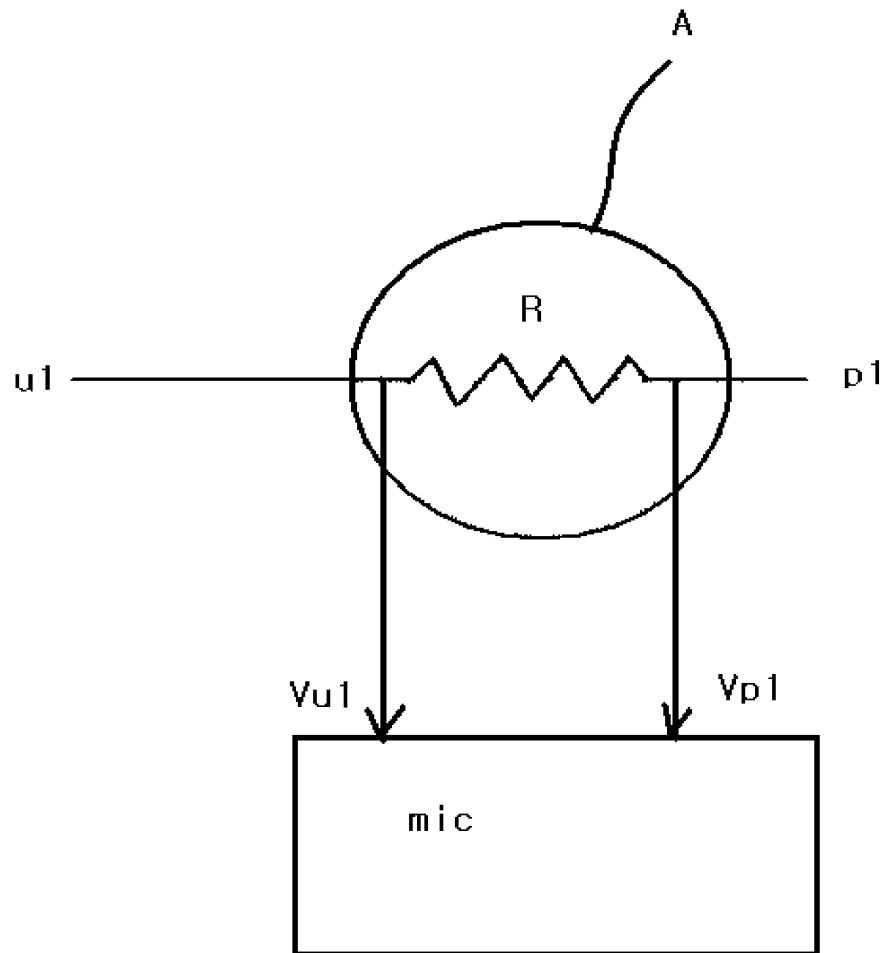
[Fig. 6]



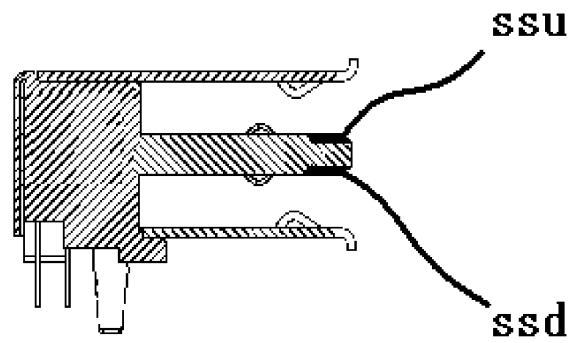
[Fig. 7]

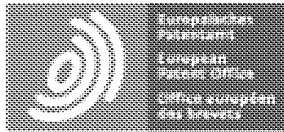


[Fig. 8]



[Fig. 9]





Espacenet

TWM253969U Connector

Applicants: INVENTEC MULTIMEDIA & TELECOM [TW]

Inventors: LOO SHENG-CHANG [TW]

Classifications:

IPC **H01R13/64**; (IPC1-7): H01R13/64;

Priorities: TW92221049U 2003-11-28

Application: TW92221049U-2003-11-28

Publication: TWM253969U-2004-12-21

Published as: TWM253969U

Connector

Abstract

No abstract found. Please consult other publications of this patent family in "Available in", if displayed above.

Patents

TWM253969



Connector

TWM253969U

Twm253969u

[Download PDF](#)[Find Prior Art](#)[Sign In](#)

Other languages: English

Inventor: Sheng-Chang Loo

Worldwide applications

2003 [TW](#)

Application TW92221049U events

2003-11-28 Application filed by Inventec Multimedia & Telecom**2003-11-28** Priority to TW92221049U**2004-12-21** Publication of TWM253969U**Info:** Cited by (9), Legal events, Similar documents, Priority and Related Applications**External links:** Espacenet, Global Dossier, Discuss

Claims (1)

[Hide Dependent](#)

1. V. Scope of Application 1. A connector structure, which is applied to a data processing device for inserting a connecting port of an electronic device, and the connecting port has a plurality of signal transmission pins, and the connector includes: The hollow shell is provided with a joint plate, so that the space of the shell is divided into a first cavity and a second cavity in f → a number of transmission units, each of the The signal transmission unit has = t connection pin and a second electrical connection pin, which are attached to the top side and the bottom side of the joint board with corresponding seals, and the signal is electrically connected; so that the connection port pin, Or perform data processing on the first electrical connection pin material processing equipment of the =>10=contacts; make the electronic device and the data 2. Such as the first item of the scope of the application for the electrical connection pin, the first -q; Sui Zhai structure, of which the first type. . The first electrical connection pin and the adapter are integrally formed into the adapter and the adapter 3. As described in item i of the scope of the patent application, the element is bent in a z-shape. 4. If the first part of the scope of the application is a wire. , The connector structure described in which the 5. as claimed in the first item of the scope of the patent, the electrical connection pins and the second described in the connector structure 6. as in the patented scope of the first, the pins are generally in the shape of a long strip. , The connecting structure described in Jin, wherein the joint M253969

The end of the plate is generally tapered.

For example, the first item in the scope of the patent application is the connector structure of the household/electrical connection pin and the second electrical connection, which starts from the first. One end of the electrical pin is bent and slightly convex, such as the belt, +, > & First, the printed circuit board has traces, and the clamp holes of the second electric connection pin and the second electric connection pin are inserted into the Y connection pin and the second electric connection pin. clamp hole

page 13

Description

M253969 4. Description of creation (1) [Technical field to which the new type belongs] This creation relates to a connector structure, which is applied to data: especially a connector structure for bidirectional insertion of connecting ports of an electronic device [Prior Art] . And full, there are a variety of data processing equipment output, type computers, and portable notebook computers, personal; Ersheng; desktop (digital Digital Assist, PDA) or digital cameras and other handheld = Processing equipment' provides a mode that can be operated anytime and anywhere, and is also convenient to carry with you. There are many and each has its own unique advantages; materials = i; The equipment wants to interact with other peripheral equipment such as electronic devices _ ^ ^ "By connecting ports and corresponding connection sockets to be connected. For peripheral equipment such as t different electronic devices on the second

SeHal machine, management equipment and keyboard, printing performance can effectively coordinate electronic devices; the transmission interface of side equipment. ^ ^ ^ settings/, the connection method of various peripheral equipment, has become the transmission wheel communication used in the industry. One of the standard interfaces. There are many related systems for the standard connector of the general serial cockroach. It has long been published and known to the public. For example, M253969 on page 5 of the Patent Publication of the Republic of China.) and Case No. 433607 (Jianfu 07) that disclosed related technologies. The 862 case provides a "USB connector" which is mainly composed of an insulating body, a black body and a hollow metal shell. direction and extend to the tube hole of the metal shell. (iv) Case

D discloses the "improved structure of the USB connector", which is technically characterized in that the two corresponding wall surfaces of the main body are extended with a horizontal surface and a vertical surface corresponding to the other wall surface to form a latching portion in the L, so that the two corresponding other wall surfaces are extended. A wall surface is in contact with the L-shaped clipping part. r connects i = f and the published materials, it can be found that f-knowing technology proposes a variety of solutions for a construction research, ... ^, ~, has the effect of. However, the use of general-purpose serial ports has its own advantages and disadvantages. If you do not leave *, when you insert the connector in reverse, you have not noticed it, but this is the solution that has been solved by the relevant manufacturers [new content]. should try to be excluded. With this in mind, this creation discloses a connector structure that solves the above problem: the bidirectional insertion and combination of ports can be effectively based on the connector structure of this creation. The housing of the scorpion and the second housing* wherein the housing accommodates a joint plate, and the transmission unit has a first cavity and a second cavity, and the signal transmission pin is connected to the first cavity. Two electrical connection pins to correspond to each other

Page 6 M253969

關係，分別緊 縮由轉接件而 此時，電子裝 裝置之連接導線，或可選擇 轉針腳插接於 設備電性相換 有別於器 創作所提供的 置結合，成功 確傳輸，且避 為該本創 經易 備。下文 詳細說明如下【實施方式】 附於接合板件 使第一電接針 置的連接導可 的訊號傳輸針 地反向插入第 一電接針腳，以進行資料 知技術僅提供 連接器結構， 營造出更 便 免使用者施力 作之上述和其 特舉數個較佳 之頂創與背側， 訊號 腳與第二電接針腳 正向插入第一腔體， 腳接觸於對應的第一二腔體， 而使連接導， 進而將 電子裝置與 的互傳作業。 第一方向的接合插入 使用者可自由地正向 利的使用機制，並確 不造成連接器的結 他目的、特徵、和優 實施例。並配合所附 傳輸單元 此相 適。而使電子 電接針 的訊號傳 資料處理方式，本 或反向插 保資料正 確換傳。 貼能更明 圖式作 依據本創作所揭 型電5自、 筆記型電腦 備，以供外部鍵盤、 或電子裝置 等產品用 窗先請參考「第1圖」 主要係包含有殼體10 體10為具有容置空間 將容置空間分隔為第 二之末端處呈進狀。4之連接器結構，可應用於個人桌上、 個人數位助理等 各種資料處理設 滑鼠、 掃描機、 數位相機等周邊設備 以進行資料互傳作業的連接埠插置。 詳說明本創作之第一 較佳實施例。、 接合板件20與訊號傳輸單元30，設 的中 空狀，並容納有接合板件20，而 一腔體11與第二腔體12，接合板件20

、創作說明 (4)。接合板件20裝配有複數個訊號傳輸單元30， 元3。具有第一電接針腳31與第二電接針腳32，電第 二電接針腳32佳；針腳32為長條狀，且一端近處 第一 電接 f ., g&#228; , , ^ ^二電接針腳32，以彼此對應的關係，分、 +腳31 =20之頂側21與底側22 k使得 = 3,當度的第二電接針腳，彼此相互對】 2 戈 u/說明裝配態樣。第一電 接針腳31的配置，為 it 11傳輸單元30的第 電接二* 義為 A、B，第二電接針腳32定義為 a、B，。 [、當 u轉接件33的4換，致使第二電接針腳32之 A、 體第二 電接針 31之相對距離而連接，同側，B接；對2 之 二接A對11， 接觸， 對應 當恰巧 u單7配置於接合板件20時，上下的接觸配 多種利：金屬的所板件的彎折狀態轉接件33亦有 施例，利用環繞 11 拉 得、為本創作之第二較佳實 21與底側22所配置的第 同樣可使接合板件20頂側 此對應，具有相同的電接針腳31與第二電接針腳32後 另外亦可使用印 刷電路板作為連接之用，如「第3、創作說明 (5)圖」所示，本實施例係利用印刷電路板50 例中的轉接件33,其中接合板件2。之相對兩側如以 例，分別裝配第一電接針 腳 與第二電接針腳 接於印刷電路板之穿孔51。印刷電路板50 *自 m時，而如同前述實施例，以彼此相且對準的關係， 接於接合板20底側22的第二電接針腳。 u 導配合 「第5圖」，電子裝置的連接入 *腔體n，致使連接後的訊號傳輸二 正向插 一電接針腳31，而令電子夢w f _ + 土 _ 11拾獲於第 料處理設備 (H中：未示) 電性相接於資 114 4;接獲於接合板件20底側21所： 1 ^ ^ ^ ^ 電子裝置與資料處理設備進行資 1、傳作業。另外，第一電接針腳31與第 電接 3+ 3g *9 末端端微彎折凸起的設計，亦確 以 =32 接觸，接觸40的訊號傳輸針腳41。 兩端中心可有效 線觀上述，本創作所揭露之處 正反雙向的插置方式，有別於習知插 換埠 功能，而充分解決傳統產品因使用的早 向插換 換埠；再者，無論正向或反向插置 K造成的結 腳可正確接收資料，實乃兼 有對應的電接針 依法提出申請。與乃聲稱&#228;與實用之優良設計， 著以上所述者， 僅為本創作其中的一較佳實施例而已，並 M253969 四、創作說明 (6) 非用來限定本創作的實施範圍；即凡依本創作申請專利範 圍所作的均等變化與修飾， 實為本創作專利 範圍所涵蓋。

Page 10 M253969

The figure is a schematic diagram of the first embodiment of the structure of the authoring connector. The figure is a schematic diagram of the second embodiment of the structure of the authoring connector. The figure is a schematic diagram of the third embodiment of the structure of the creative connector. *The picture shows the front view of the structure of the creative connector. Figure 15 is a schematic diagram of the use of the structure of the creative connector. ... 10 Shell 11 First cavity 12 Second cavity 20 Joining plate 21 Top side 22 Bottom side 24 Groove 30 Signal transmission unit 31 First electrical connection pin 32 Brother-electrical connection pin 33 Adapter 40 Connection port 41 Signal transmission pin 50 Printed circuit board 51 Clamp hole

page 11

Cited By (9)

Publication number	priority date	Publication date	Assignee	Title
CN104425960A *	2013-09-06	2015-03-18	Foxconn (Kunshan) Computer Connector Co., Ltd.	electrical connector combination
CN105337106A *	2014-08-27	2016-02-17	Foxconn (Kunshan) Computer Connector Co., Ltd.	Electrical connector and method of making the same
US9287668B2	2012-10-18	2016-03-15	Hon Hai Precision Industry Co., Ltd.	I/O plug connector adapted for normal insertion and reverse insertion into I/O receptacle connector and connector assembly having the two
US9450355B2	2014-03-12	2016-09-20	Foxconn Interconnect Technology Limited	USB plug connector and method for manufacturing the same
CN106025637A *	2016-07-18	2016-10-12	Qingdao Hisense Mobile Communication Technology Co., Ltd.	Usb interface
TW578633B *	2014-08-22	2017-04-11	Hongteng Precision Technology Co., Ltd.	電連接器及其製造方法
US9722383B2	2014-05-07	2017-08-01	Foxconn Interconnect Technology Limited	Electrical connector having insulative housing and method of making the same
US9847605B2	2014-05-07	2017-12-19	Foxconn Interconnect Technology Limited	Method of manufacturing an electrical connector having an insulative housing for two rows of terminals
US10589932B2	2010-07-19	2020-02-11	Chou Hsien Tsai	Bidirectional duplex electrical connector having circuit board
Family To Family Citations				

* Cited by examiner. † Cited by third party. ‡ Family to family citation

Similar Documents

Publication	Publication Date	Title
TWM253969U	2004-12-21	Connector
TW389010B	2000-05-01	Electronic connector adapter with power input
US7322857B2	2008-01-29	Electric power connector adapting structure
TW200537748A	2005-11-16	Configuration changeable adapter
TW200539524A	2005-12-01	Foolproof jack
CN201639126U	2010-11-17	具有信号耦合电路的扩充接口模块
TWM422178U	2012-02-01	Photoelectric signal converting module
TWI232009B	2005-05-01	Slim phone jack
CN2733636Y	2005-10-12	可双面插接的usb接头
TWM411679U	2011-09-11	Connector expansion module implemented through PCI-E bus
CN207038782U	2018-02-23	柔性电路板与连接器母座的连接结构
CN210985048U	2020-07-10	一种微型usb接口插座
CN211719831U	2020-10-20	方便插接的usb连接器
TWI38327B	2016-06-11	充電轉接頭及電子裝置的充電方法
CN212011366U	2020-11-24	一种pc连接器
CN209963328U	2020-01-17	一种usb母座连接器
TWM383224U	2010-08-21	Micro USB socket connector
TWM491270U	2014-12-01	端子模組
TW434949B	2001-05-16	Connection wire apparatus and equipment end connector for transmitting signal and power
TWM251317U	2004-11-21	Circuit board connector
TWM559522U	2018-05-01	適用於多種傳輸介面的連接器
TWM347616U	2008-12-11	Circuit board module with polygon-shaped circuit
TWM290324U	2006-05-01	USB connector module
TWM332277U	2008-05-11	Electrical connector
TWI375372B	2012-10-21	Electrical receptacle connector and assembly thereof

Priority And Related Applications

Priority Applications (1)

Application	Priority date	Filing date	Title
TW92221049U	2003-11-28	2003-11-28	Connector

Applications Claiming Priority (1)

Application	Filing date	Title
TW92221049U	2003-11-28	Connector

Legal Events

Date	Code	Title	Description
2009-10-01	MM4K	Annulment or lapse of a utility model due to non-payment of fees	

Concepts

machine-extracted

 Download  Filter table

Name	Image	Sections	Count	Query match
 biological transmission		claims,description	17	0.000
 corresponding		claims,description	9	0.000
 insertion		claims,description	7	0.000
 material		claims,description	4	0.000
 jaw		claims	1	0.000
 cakes		claims	1	0.000
 fasting		claims	1	0.000
 spinning		claims	1	0.000

Show all concepts from the description section

Data provided by IFI CLAIMS Patent Services

[About](#) [Send Feedback](#) [Public Datasets](#) [Terms](#) [Privacy Policy](#)

公告本

申請日期： 92-11-28	IPC分類
申請案號： 92221049	H01R 13/64

(以上各欄由本局填註)	新型專利說明書 M253969
-------------	-----------------

一、 新型名稱	中文	連接器結構
	英文	
二、 創作人 (共1人)	姓名 (中文)	1. 羅盛章
	姓名 (英文)	1. LOU SHENG CHANG
	國籍 (中英文)	1. 中華民國 TW
	住居所 (中文)	1. 台北市內湖區內湖路一段396號5樓
	住居所 (英文)	1.
三、 申請人 (共1人)	名稱或 姓名 (中文)	1. 英保達股份有限公司
	名稱或 姓名 (英文)	1. INVENTEC MULTIMEDIA & TELECOM
	國籍 (中英文)	1. 中華民國 TW
	住居所 (營業所) (中文)	1. 台北市內湖路一段396號5樓 (本地址與前向貴局申請者相同)
	住居所 (營業所) (英文)	1.
	代表人 (中文)	1. 葉國一
	代表人 (英文)	1.



一、本案已向

國家(地區)申請專利

申請日期

案號

主張專利法第一百零五條準用
第二十四條第一項優先權

無

二、☐主張專利法第一百零五條準用第二十五條之一第一項優先權：

申請案號：

無

日期：

三、主張本案係符合專利法第九十八條第一項☐第一款但書或☐第二款但書規定之期間

日期：



四、創作說明 (1)

【 新型所屬之技術領域 】

本創作係有關一種連接器結構，應用於資料處理設備，特別是可供電子裝置之連接埠雙向插置的連接器結構。

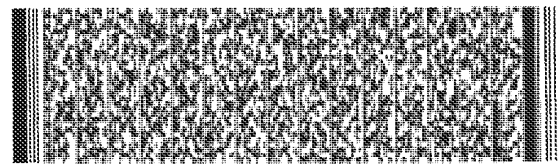
【 先前技術 】

電子產業的興盛，目前已有多種資料處理設備的產出而滿足不同的使用需求。如提供強大的資料處理性能的桌上型電腦，而方便攜帶的筆記型電腦、個人數位助理 (Personal Digital Assist, PDA) 或數位相機等手持式資料處理設備，則提供可隨時隨地操作模式亦便於隨身攜行。

上述各類資料處理設備的種類眾多而各具有獨到的優勢，然對於產品的擴充功能卻具有相同的解決方案。大體而言，各類資料處理設備欲與其他電子裝置等周邊設備互傳資料，必須藉由連接埠與對應的連接座加以相接。針對市面上多種不同的電子裝置等周邊設備，日前由各企業共同制訂出一種傳輸介面，通用序列埠 (Universal Serial Bus)

通用序列埠是一種介於資料處理設備與鍵盤、印表機、掃描器、數位相機等各類周邊設備的傳輸介面，其出現有效統籌電子裝置與各類周邊設備的連接方式，目前已成為產業界常用的傳輸通訊標準介面之一。

其中符合通用序列埠之規範的連接器，有許多相關製作技術早已公開而為社會大眾所知悉，如中華民國專利公



四、創作說明 (2)

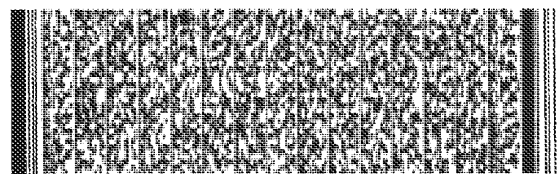
告第435862號（簡稱862案）與第433607案（簡稱607案）即揭露有相關的技術。862案提供一種「USB連接器」，主要係由絕緣主體、嵌此與中空之金屬殼體所構成，其特徵在於金屬殼體具有裂縫，係自絕緣主體之插入端，順沿絕緣主體之插入方向而延伸至金屬殼體之卡孔。607案揭露「USB連接器改良構造」，其技術特徵在於主體兩相對應的壁面上延伸有對應另一壁面的水平面與垂直面，而形成L型的卡接部，而使兩對應的另一壁面與L型卡接部產生干涉。

綜觀上述與已公開的資料中可以發現，習知技術針對連接器的組配結構進行研究而提出多種解決方案，而可合理的實行並具有一定的效果。然通用序列埠的使用具有方向性，因此使用者若稍不留意，以反向插入連接器之時，將迫使連接器產生形變而造成連接器結構上的損傷，或因訊號不正確而無法正確傳遞資料。此乃至今相關生產業者並未留意而尚無對應解決的方案，應設法予以排除。

【新型內容】

有鑑於此，本創作揭露一種連接器結構，提供一種可讓電子裝置的連接埠雙向插置結合的連接器結構，可有效解決上述問題。

依據本創作之連接器結構，主要係由中空之殼體與複數個訊號傳輸單元所構成，其中殼體容設有接合板件，而將殼體內的容置空間分隔出第一腔體與第二腔體，訊號傳輸單元具有第一電接針腳與第二電接針腳，以彼此對應的



四、創作說明 (3)

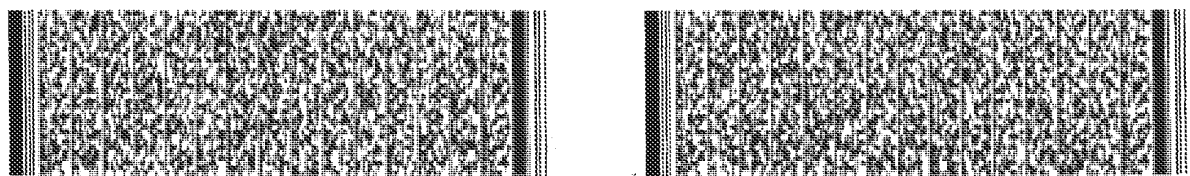
關係，分別緊附於接合板件之頂側與背側，訊號傳輸單元藉由轉接件而使第一電接針腳與第二電接針腳彼此相連。此時，電子裝置的连接埠可正向插入第一腔體，而使電子裝置之连接埠的訊號傳輸針腳搭觸於對應的第一電接針腳，或可選擇地反向插入第二腔體，而使连接埠的訊號傳輸針腳搭觸於第二電接針腳，進而將電子裝置與資料處理設備電性相接，以進行資料的互傳作業。

有別於習知技術僅提供單一方向的接合插入方式，本創作所提供的連接器結構，使用者可自由地正向或反向插置結合，成功營造出更為便利的使用機制，並確保資料正確傳輸，且避免使用者施力不當造成連接器的結構損傷。

為讓本創作之上述和其他目的、特徵、和優點能更明顯易懂，下文特舉數個較佳實施例，並配合所附圖式，作詳細說明如下。

【實施方式】

依據本創作所揭露之連接器結構，可應用於個人桌上型電腦、筆記型電腦、個人數位助理等各種資料處理設備，以供外部鍵盤、滑鼠、掃描機、數位相機等周邊設備或電子裝置等產品用以進行資料互傳作業的连接埠插置。首先請參考「第1圖」來說明本創作之第一較佳實施例，主要係包含有殼體10、接合板件20與訊號傳輸單元30，殼體10為具有容置空間的中空狀，並容設有接合板件20，而將容置空間分隔為第一腔體11與第二腔體12，接合板件20之末端處呈錐狀。

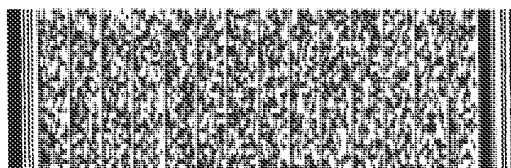


四、創作說明 (4)

接合板件20裝配有複數個訊號傳輸單元30，訊號傳輸單元30具有第一電接針腳31與第二電接針腳32，藉由轉折件33而連接第一電接針腳31與第二電接針腳32。較佳者，第一電接針腳31、第二電接針腳32與轉折件33為金屬材質的板件彎折而成立體的U狀。第一電接針腳31與第二電接針腳32為長條狀，且一端近緣處具有彎折凸起，轉折件33彎折呈Z狀。組配時，訊號傳輸單元30之第一電接針腳31與第二電接針腳32，以彼此對應的關係，分別緊附於接合板件20之頂側21與底側22，而使得頂側21的第一電接針腳31與底側22的第二電接針腳，彼此相互對應。續請配合「第4圖」來說明裝配態樣，第一電接針腳31的配置，為求方便說明，將訊號傳輸單元30的第一電接針腳31依序定義為A、B、C、D，第二電接針腳32定義為A'、B'、C'、D'，經由轉接件33的連接，致使第二電接針腳32之A'與第一電接針腳31之A而相對呼應而連接，同理，B接腳對應於B'接腳，C接腳對應於C'接腳，D接腳對應於D'接腳。換言之，訊號傳輸單元30配置於接合板件20時，上下的接腳配置恰巧相反。

除了利用金屬材質的板件的彎折狀態，轉接件33亦有多種變化，如「第2圖」所示，係為本創作之第二較佳實施例，利用導線作為轉接件33，同樣可使接合板件20頂側21與底側22所配置的第一電接針腳31與第二電接針腳32彼此對應，具有相同的效果。

另外亦可使用印刷電路板作為連接之用，如「第3



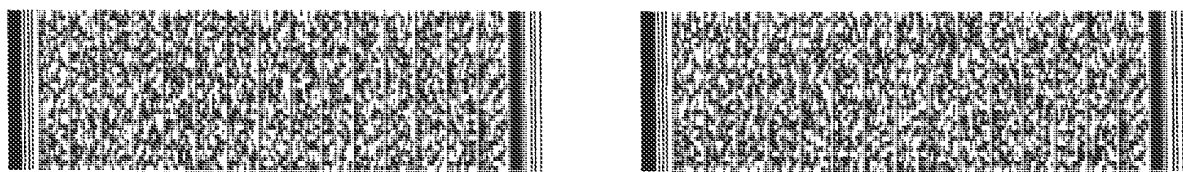
四、創作說明 (5)

圖」所示，本實施例是利用印刷電路板50來取代前述實施例中的轉接件33，其中接合板件20之相對兩側如同前述實施例，分別裝配第一電接針腳31與第二電接針腳32，再相接於印刷電路板50之箔孔51。印刷電路板50配置有走線，以使接合板20頂側21所配置的第一電接針腳31，藉由印刷電路板50走線，而如同前述實施例，以彼此相互對應的關係，連接於接合板20底側22的第二電接針腳。

續請配合「第5圖」，電子裝置的連接埠40可正向插入第一腔體11，致使連接埠40的訊號傳輸針腳41搭觸於第一電接針腳31，而令電子裝置（圖中未示）電性相接於資料處理設備（圖中未示），進行資料的互傳作業。同理，亦可選擇地將連接埠40以反向插入第二腔體12，而使得連接埠40的訊號傳輸針腳41搭觸於接合板件20底側21所配置的第二電接針腳32，亦使電子裝置與資料處理設備進行資料的互傳作業。另外，第一電接針腳31與第二電接針腳32末端略微彎折凸起的設計，亦確保訊號傳輸單元30可有效搭觸連接埠40的訊號傳輸針腳41。

綜觀上述，本創作所揭露之連接器結構，提供連接埠正反雙向的插置方式，有別於習知連接器提供的單向插接功能，而充分解決傳統產品因使用者插置不當所造成的結構損壞；再者，無論正向或反向插置，皆有對應的電接針腳可正確接收資料，實乃兼顧創意與實用之優良設計，爰依法提出申請。

以上所述者，僅為本創作其中的較佳實施例而已，並



四、創作說明 (6)

非用來限定本創作的實施範圍；即凡依本創作申請專利範圍所作的均等變化與修飾，皆為本創作專利範圍所涵蓋。



圖式簡單說明

第1圖為本創作連接器結構之第一實施例示意圖。

第2圖為本創作連接器結構之第二實施例示意圖。

第3圖為本創作連接器結構之第三實施例示意圖。

第4圖為本創作連接器結構之正視圖。

第5圖為本創作連接器結構之使用示意圖。

【圖示符號說明】

10	殼體
11	第一腔體
12	第二腔體
20	接合板件
21	頂側
22	底側
24	穿槽
30	訊號傳輸單元
31	第一電接針腳
32	第二電接針腳
33	轉接件
40	連接埠
41	訊號傳輸針腳
50	印刷電路板
51	箱孔



四、中文創作摘要 (創作名稱：連接器結構)

一種連接器結構，應用於資料處理設備，主要係由中空的殼體與訊號傳輸單元所組成，殼體內裝配有接合板件而將殼體的容置空間分隔出第一腔體與第二腔體，訊號傳輸單元具有第一電接針腳與第二電接針腳，分別緊附於接合板件之頂側與底側，訊號傳輸單元包含有轉接件以使第一電接針腳相連於第二電接針腳，致使電子裝置的連接埠可選擇地正向插入第一腔體或反向插入第二腔體，而電性相接於資料處理設備，進行資料的互傳作業。

五、英文創作摘要 (創作名稱：)

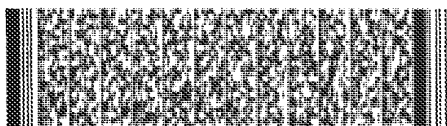


六、指定代表圖

(一)、本案代表圖為：第____5____圖

(二)、本案代表圖之元件代表符號簡單說明：

10	殼體
11	第一腔體
12	第二腔體
20	接合板件
21	頂側
31	第一電接針腳
40	連接埠
41	訊號傳輸針腳

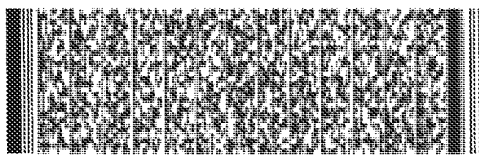


五、申請專利範圍

1. 一種連接器結構，應用於一資料處理設備，以供一電子裝置之連接埠插置，且該連接埠具有複數個訊號傳輸針腳，該連接器係包括有：

一中空之殼體，容設有一接合板件，以將該殼體內之容置空間分隔為一第一腔體與一第二腔體；及

複數個訊號傳輸單元，每一該訊號傳輸單元具有一第一電接針腳與一第二電接針腳，以彼此對應的關係分別緊附於該接合板件之頂側與底側，且該訊號傳輸單元係透過一轉接件而令該第一電接針腳與該第二電接針腳相連，致使該連接埠可選擇地插入該殼體之第一腔體，以令傳輸針腳搭觸對應之該第一電接針腳，或將該連接埠插入該第二腔體，以令該傳輸針腳搭觸對應之該第二電接針腳，而使該電子裝置與該資料處理設備進行資料的互傳作業。
2. 如申請專利範圍第1項所述之連接器結構，其中該第一電接針腳、該第二電接針腳係與該轉接件係為一體成型。
3. 如申請專利範圍第1項所述之連接器結構，其中該轉接件係彎折呈Z狀。
4. 如申請專利範圍第1項所述之連接器結構，其中該轉接件係為一導線。
5. 如申請專利範圍第1項所述之連接器結構，其中該第一電接針腳與該第二電接針腳係概呈長條狀。
6. 如申請專利範圍第1項所述之連接器結構，其中該接合



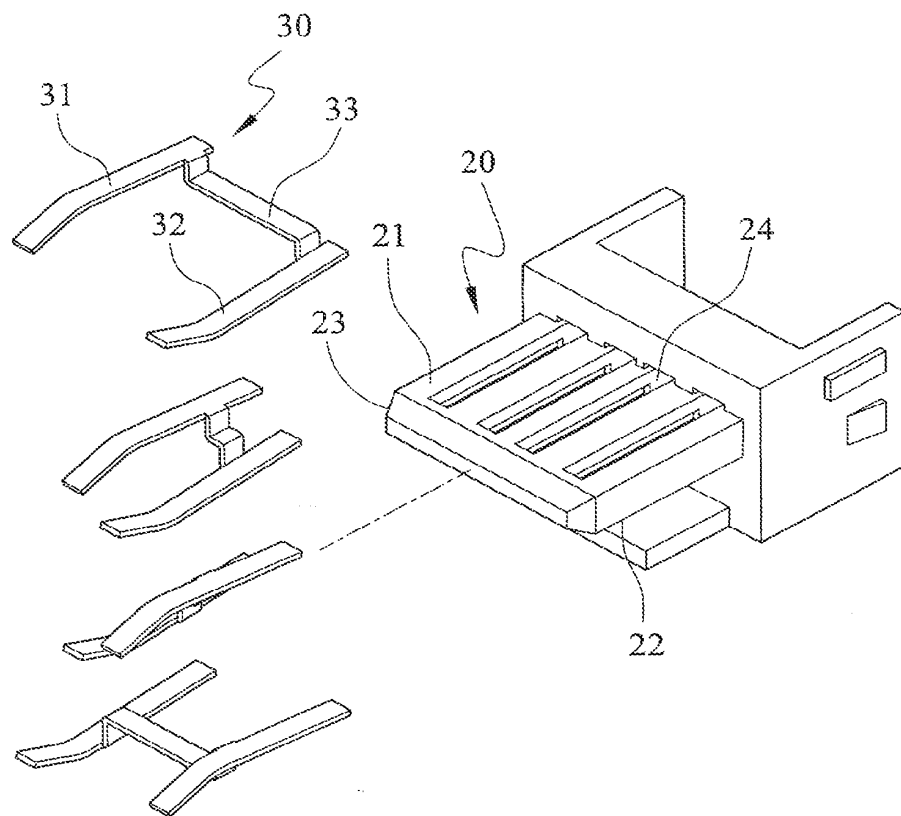
五、申請專利範圍

板件之末端係概呈錐狀。

7. 如申請專利範圍第1項所述之連接器結構，其中該第一電接針腳與該第二電接針腳之一端係彎折而略微凸起。
8. 如申請專利範圍第1項所述之連接器結構，其中該轉接件係為一印刷電路板，且該印刷電路板具有走線，與對應於該第一電接針腳與該第二電接針腳之箝孔，以使該第一電接針腳與該第二電接針腳插置入該箝孔而彼此相接。

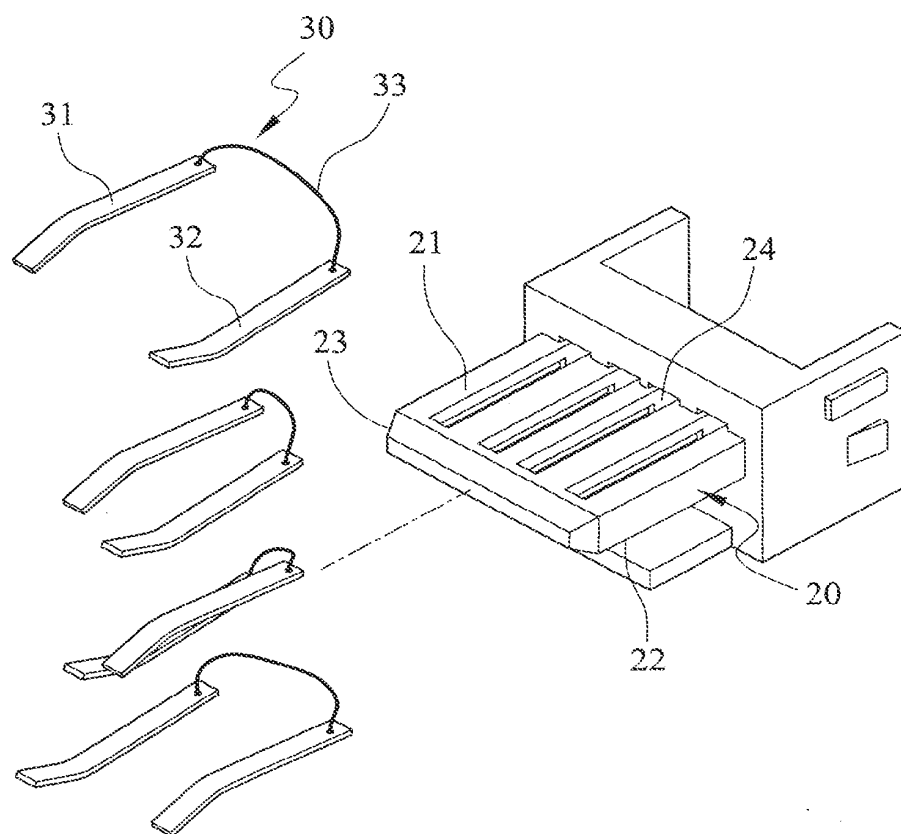


圖式



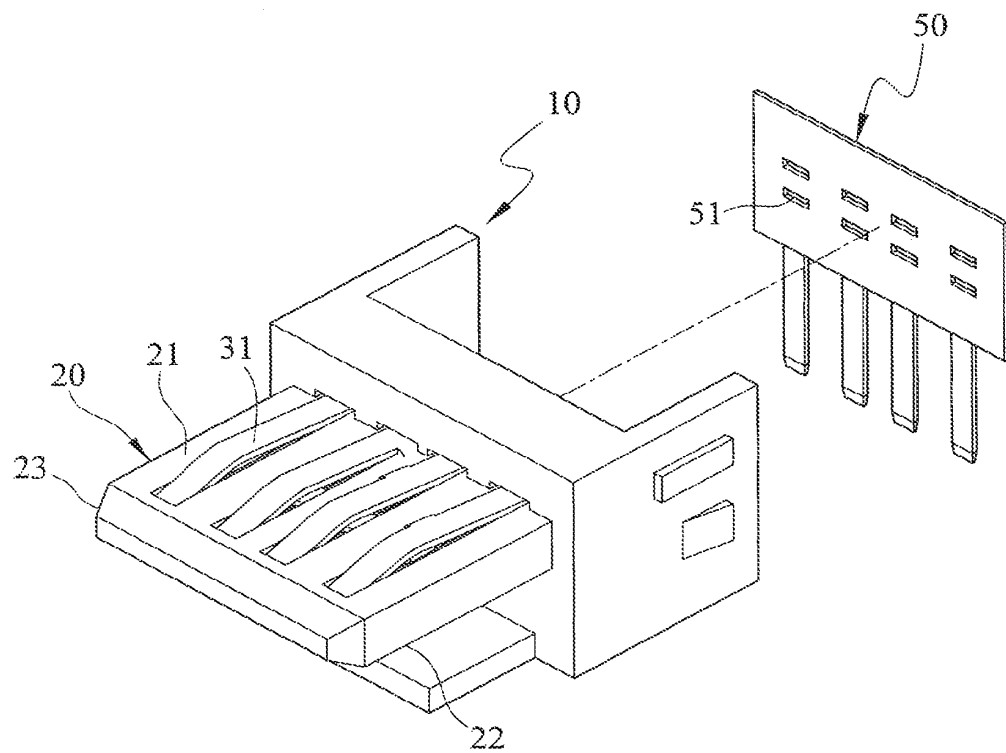
第 1 圖

圖式



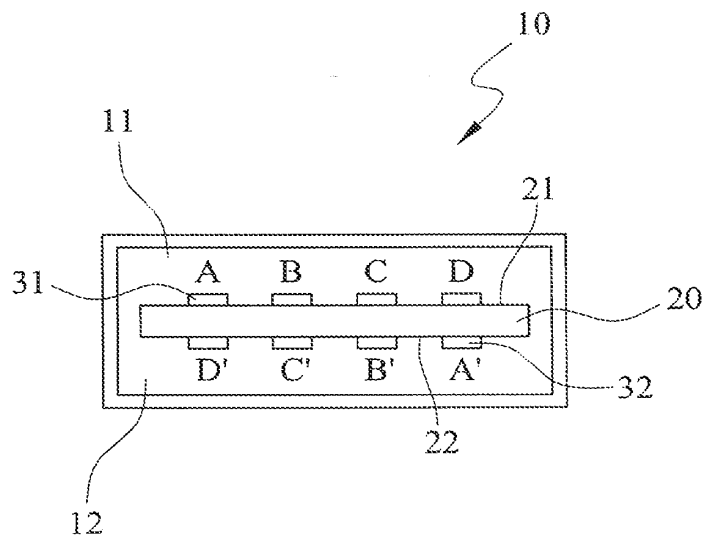
第 2 圖

圖式



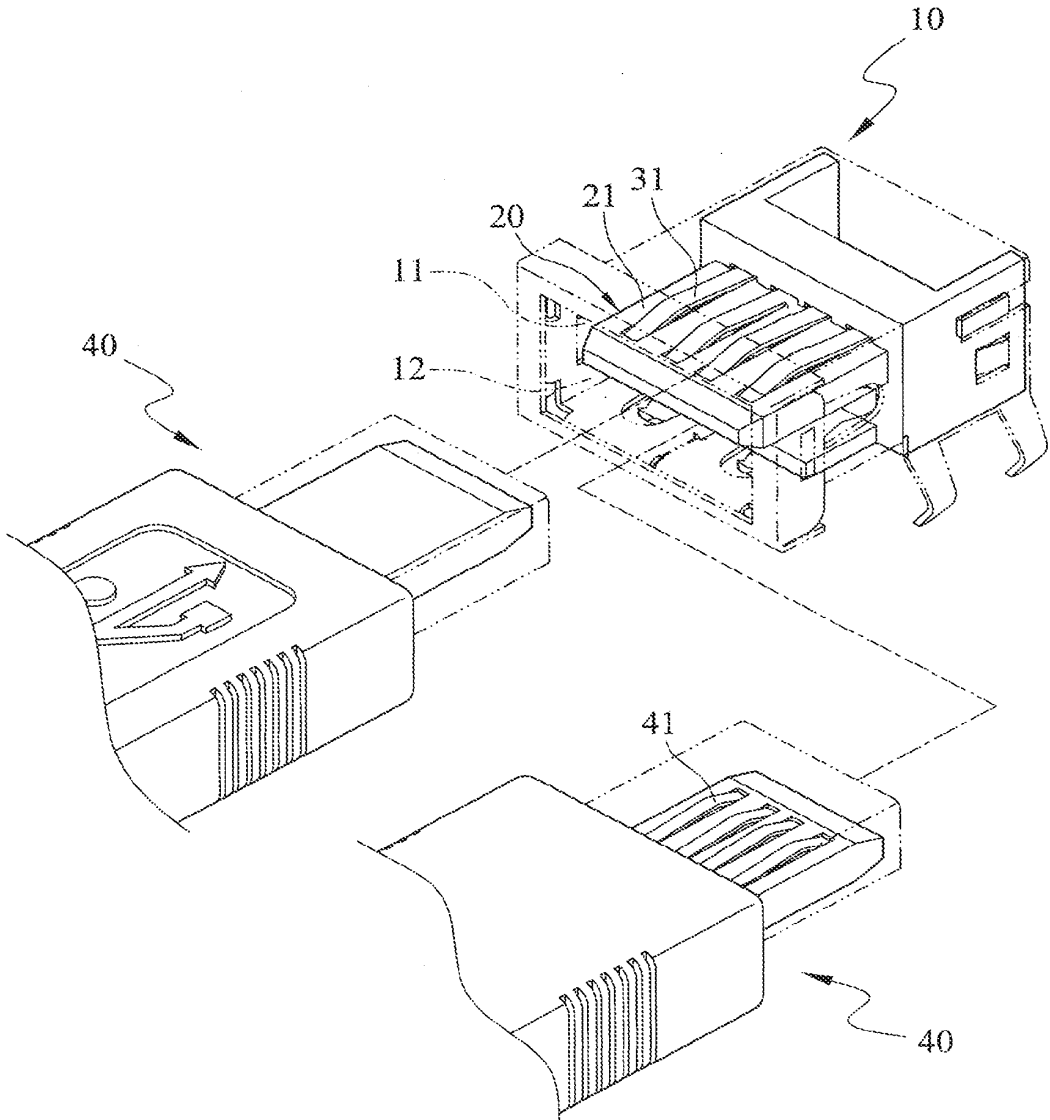
第 3 圖

圖式



第 4 圖

圖式



第 5 圖



UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
17/974,866

RECEIPT DATE / TIME
04/30/2024 05:38:15 PM Z ET

ATTORNEY DOCKET #
10186PAT-1-REI-CON

Title of Invention

SOCKET STRUCTURE WITH DUPLEX ELECTRICAL CONNECTION

Application Information

APPLICATION TYPE Utility - Reissue

PATENT # -

CONFIRMATION # 1048

FILED BY Joanne Vos

PATENT CENTER # 65322824

FILING DATE 10/27/2022

CUSTOMER # 22442

FIRST NAMED
INVENTOR Chou Hsien Tsai

CORRESPONDENCE
ADDRESS -

AUTHORIZED BY Jason Vick

Documents

TOTAL DOCUMENTS: 34

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
KR1020070039956A.pdf	64	Foreign Reference	6455 KB
TWM253969U.pdf	23	Foreign Reference	3585 KB
WO0243192A2.pdf	11	Foreign Reference	387 KB
WO2005013436A1.pdf	29	Foreign Reference	2025 KB
WO2006065681A1.pdf	32	Foreign Reference	1556 KB
WO2006074348A1.pdf	31	Foreign Reference	1384 KB
WO2008065659A2.pdf	20	Foreign Reference	934 KB
WO2008121731A1.pdf	15	Foreign Reference	911 KB

WO2009069969A2.pdf	20	Foreign Reference	576 KB
Canon_Trident_Connectors.pdf	72	Non Patent Literature	1727 KB
Department_of_defense_interface_standard.pdf	219	Non Patent Literature	991 KB
Why_are_so_many_plugs.pdf	12	Non Patent Literature	668 KB
SHANKLAND_Intels_light_peak.pdf	4	Non Patent Literature	615 KB
WILLINGTON_flipper_USB_enables.pdf	5	Non Patent Literature	375 KB
102010014793_patent_reg_info.pdf	2	Non Patent Literature	169 KB
202010017854_patent_reg_info.pdf	2	Non Patent Literature	146 KB
JP2010091610_OA_07-12-2010.pdf	2	Non Patent Literature	513 KB
JP2012002496_OA_05-31-2012.pdf	4	Non Patent Literature	366 KB
20100034310_OA_07-27-2011.pdf	6	Non Patent Literature	1493 KB
20100034310_OA_11-30-2011.pdf	4	Non Patent Literature	879 KB
20100034310_NOA_05-18-2012.pdf	2	Non Patent Literature	373 KB
098117405_Unpublished_App.pdf	38	Non Patent Literature	1420 KB

099100847_Unpublished_Ap p.pdf	53	Non Patent Literature	1902 KB
098210021__Biblio__Data.pdf	17	Non Patent Literature	3621 KB
099108987__Biblio__Data.pdf	107	Non Patent Literature	5986 KB
099224051__Biblio__Data.pdf	150	Non Patent Literature	9088 KB
099225602__Biblio__Data.pdf	78	Non Patent Literature	4805 KB
100203503__Biblio__Data.pdf	69	Non Patent Literature	15769 KB
101208435__Biblio__Data.pdf	116	Non Patent Literature	6829 KB
10186PAT-1_OARR_10-17- 2011.pdf	5	Non Patent Literature	3866 KB
10186PAT-1_OA_12-07- 2011.pdf	11	Non Patent Literature	8186 KB
10186PAT-1_NOA_03-16- 2012.pdf	6	Non Patent Literature	343 KB
10186PAT-1-REI_OA_01-11- 2022.pdf	23	Non Patent Literature	1108 KB
10186PAT-1-REI_NOA_08- 17-2022.pdf	8	Non Patent Literature	672 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
KR1020070039956A.pdf	0F671F921F26C25F25710C66A3F3DF215B2B7DF664645D5B7D 5ACACFD3D78790E1AFA97CF175DCA2C11FB15CD470AB9079 CB471AD6F4AAE81BBFA5B3C2902C94

TWM253969U.pdf	47B629A57196D84FE38AC141388A876F8F61673447BDAC7FA5 DB832A9878F26442854D9CC471F64BBD6E62676B653787EEA F27DD4703C6F139F91131161C01AD
WO0243192A2.pdf	77D10E66A1EFD0A4277AEDFE7B47BA042C351D0C6BB2D555 1B11A51908EFDEEB10C72700CD98F3F81E617D70967328338 C7DB78837C3C079C66E9C0918C1ADC8
WO2005013436A1.pdf	957B6182F7933B1705C99CC4D6B900AE7583E96F39C0E89277 9A47110B352437B1D09DF994D78B0E311CF035EFFD148849C3 02476AB2861E23ED3DC947DE7C21
WO2006065681A1.pdf	8320BC00BEEA09CD954B94B3FB700E8E0B16F14EC76635161 A43075EF8F80E3700C536D17CDE670A902EEDF5CD4F8A7F61 8CC1A38D93A80F2C2034D5AE8BDFA4
WO2006074348A1.pdf	0A02DCA60254E91E794F1E85F139943DC066C92D86201CB07 1851DF8D263A6296711FAA4344570454E43869EEF1299513E2 D232FABC4FC6F11271553E2121FA1
WO2008065659A2.pdf	711393F46CD526103FF5194B80A765536BF042460147FAC031F ACBE4AE7C01CF1C3B507228934E10FB6AE47A7C263E468F60 0D635FCEC57548C09F4140CAAF60
WO2008121731A1.pdf	39BD302487ACFC607F71773499DCB0D8CB318185550514794A E2BCEF8801884F2E030F369206366E1C7EEF356803C6D465B CAC7DE34E787C1263FF3C950ABEC6
WO2009069969A2.pdf	3132D6C4344F6CA557302F6DFA6C88E7713AF0FF6C877174C 24655D722B0B8AD7C904F05852130982F4DEA6042DB87A2E12 9F9E40A50E64B89DA29E3E8951EBE
Canon_Trident_Connectors.pdf	C2E00D355EED08CE21BADB70AFB9E023C74E6F9C5A59EF9D B34DC85F7CDBD96E7BCCD07F08374D3E8E5091AFC2B73744 7B137163801F58A1CF38D2CDF2105537
Department_of_defense_interfa ce_standard.pdf	0D47FE45E322BA2CA6193440448BCE13725E9E3361A0DFD99 1A37BAFCF8FBED0EC9504577DA24FBB188AE24BCF4B69A89 2F8A71EC4C70A2CEBD42BDDF2C9D1C7

Why_are_so_many_plugs.pdf	F6ECF67C5B7EDD5CA929456AD9F72D9598A26AE3CEBCBCF A653EF2323744E1308947EE240E5EB71D52E0274E3B96A4B0D 2B5876C2AA8FD6CDF6822CC3F4E17E8
SHANKLAND__Intels_light_peak .pdf	DC47572AF02CD3DCBABA209F2A0C75A96AE1F49852EDEB68 D1DA17DF835FB7BAD9AFDAFF61099CA8236B16B49761CBF2 3E19E027C5EB8AEE5CB5055B23337C81
WILLINGTON_flipper_USB_ena bles.pdf	D0F773BC94ABBD04883B2DED2F43B4E0E75A96BB62832E47 B5B132C4088712BAE83AFC8CD990FA4766F0F812DB409C3A4 1CAC5B3C8EBEA66C03B518C7BCE7D0F
102010014793__patent_reg_info .pdf	B37D779DA4D9B014C1A76AF6EC0B4277E7FDD32AD4D2E721 A64339C75842A12785CBDC34D5213C4B2181D19CA57FED93E 463BD48773D06CD7A1555C85BC1BACA
202010017854__patent_reg_info .pdf	9F70E6CCE8DCA4B2E29A7DC3C2E88FAEEADB0FD1BD10E91 698CFFAE60924BEEA521E1B1330FBD8BF84FF560B8BB0326C 646BE3878900301604C99EF988F6457F
JP2010091610__OA__07-12- 2010.pdf	58D151FEC1312635CAC79D0C2D3D3F8ED0E3A28396ACE82B 83034F5270FCF7AB9FE75949A4D6240BEF06E1205062775413 5EF5C2FE6FCCD00BBDDC8A53180357
JP2012002496__OA__05-31- 2012.pdf	3A3CF142C9CE35DF759440D842D1E6D4F8BE53F88978469FC 1247DEEF69BB06F40EE36E07523C804986B8D8C2E302E60319 2C7CA9607A46A900A020979ED678E
20100034310__OA__07-27- 2011.pdf	4E24491AB02F9339F20E698306172A9282E6843F91CFD84A044 7BCAD96791DCF36A5049F34842C790DF8E6BB29AB39F0001A 311D8D2400AD8374CD9F6136B0EC
20100034310__OA__11-30- 2011.pdf	14C66E9AC3869B317384828B7C3ECCFE9FDC2C92E1D035B9 E3EF2BC2EF313162655248D4E3A85E0C7E741DA6D0AC731C6 AF7C7E5913F45C986D9961D6734BF5A
20100034310__NOA__05-18- 2012.pdf	DE9FB91C1916D4F46BC2C452FCF3016B13EC6710DD8B8E9E 3C2FA59EC6A7944E1F79E49F868D8806CC7AA06245282C8C9 743A94EAB86C7A9255D3B7C07F83C6E

098117405__Unpublished_App.pdf	71B4E4254F47A5C56A0F2D27E197C1D8FD4F56C27F09CEDE CFB3CE89F76CE972700D37E03D5AB948BE4ECD6193F657A9 D3C42419FC1B2DD3B7E9718682329FDC
099100847__Unpublished_App.pdf	46C2470FCD8559292FCFC079E2CC2B9DCFD08F13A74D6CB7 22C5E10178B862395A4318C88AD0835D7115FA396E5F432A15 51CBDFE6B6AEA10FA64F79BCB44A34
098210021__Biblio__Data.pdf	3B2CD7C2DC38BA6A357DF2E8A9287D740952711A756BB8716 28736EEFBB23DD63219636FEAAAB328A90E385E711B2A4C7B FFE11EE70D388E15AEA9D1E7A877E7
099108987__Biblio__Data.pdf	B3AF6C0516948521F53E1BCCEAD6101778220EF53D928162D 10736923F5AAF7FF3CE58C82AAA45B3CD6E3295F0FF92062C 3E58D2CAC159CB8814F00161003458
099224051__Biblio__Data.pdf	CA15ADD162E81494032AF79E61173F72FC7A57D2AC56EF8F1 97AEC7C4F05CC06DD89AA51C9C2BB6AAB94A4E6FB6BDF0B E0B5FCB9442F168CAB7DC220B94D3A15
099225602__Biblio__Data.pdf	B6C2EB5C5A8B61B4F7534DAFFB2D8CFCDD9DAE1DAA1DF609 51A2084BBAE7E006AA15FEF4F0414664815814A82637586C4E 897D9CF228CC14AFD38FF164A81ECBF
100203503__Biblio__Data.pdf	DEA61935C3BB3B0FE366EC351DB75A78803E3209A2341E9ED 82291F11A58BBCC306C7E2BBC8AFEF023BA2B38DFC5438816 B9A2E4C5671DAE525DF552DCF94D42
101208435__Biblio__Data.pdf	3F8759B5CF51AFB33F7A10B8E49B92C7DC2A3697762A29E26 18226E2EA84AAA611A844BAB785F902EF3E8CC1DD71AC9D6 D05C0AB480E1DA728E9AEF0F70DB3AA
10186PAT-1__OARR__10-17-2011.pdf	E1505D02D8949FF6A5D8402733FAC9ACB99525CFD3EC6D2F B72A4CEB7FCE49A5459CA1333842F6216BB1810DAA9636CBF D58E44E882288F2A15802F7023ADCEA
10186PAT-1__OA__12-07-2011.pdf	1E3D1755B520479AD8B7F1D04C63B862E902D50B36A399AC7 86CBDD4F773B1F848F0E96A13EDCCEDF8CFC0413A6B3B3E2 4A15843A9CA539A5780D4159307AD39

10186PAT-1_NOA_03-16-2012.pdf	08CB33BA6463C20D70442AEA419DDBA9670AF49D57045570B3F708300B38E095B94D1314E0A992FE866EA0A169C7791CE02E3249AE1D80BC4DA0DB41CA7E85F2
10186PAT-1-REI_OA_01-11-2022.pdf	640A6609F37D6C238E3AA9B2FE48833179712579B6B9BA573BE1C4DB72941F4152200AA5A967D383D572520316940A8174F9181B814E46A916774E454A852689
10186PAT-1-REI_NOA_08-17-2022.pdf	99B5582124F10A71BCC47F2E3747ECBF4AA927D357A79179DD1A2D19519986A38BFFDC578E59959D352A2D321F518B0E70B10B437B5101253C9DEFC1A26DAA30

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 May 2002 (30.05.2002)

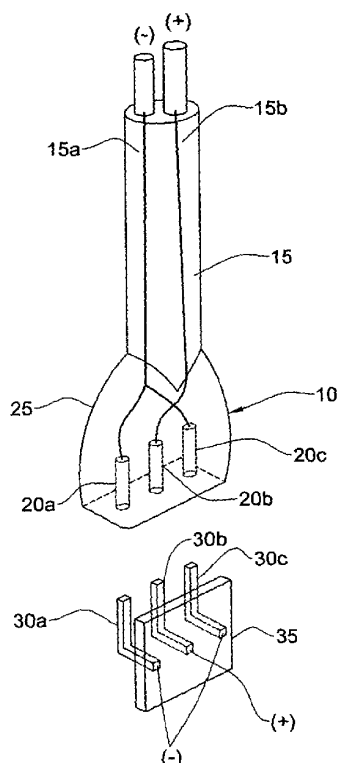
PCT

(10) International Publication Number
WO 02/43192 A2

- (51) International Patent Classification⁷: **H01R 13/64**, 31/06
- (71) Applicant and
(72) Inventor: **GIVON, Menachem** [IL/IL]; DN Hanegev, 85320 Kibbutz Shoval (IL).
- (21) International Application Number: PCT/IB01/02163
- (74) Agent: **REINHOLD COHN AND PARTNERS**; P.O.Box 4060, 61040 Tel-Aviv (IL).
- (22) International Filing Date:
19 November 2001 (19.11.2001)
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/252,619 22 November 2000 (22.11.2000) US
- (71) Applicant (*for all designated States except US*): **ELECTRIC FUEL (E.F.L.) LTD.** [IL/IL]; Western Industrial Park, P.O.Box 641, 99000 Bet Shemesh (IL).
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: DUAL ORIENTATION CONNECTOR



(57) Abstract: An adapter cord for use with a power supply provides a coaxial connector on one end and a bilaterally symmetric connector on the other end. The coaxial connector is adapted for connection to a load and the bilaterally symmetric connector is adapted for use with a power supply. The bilaterally symmetric connector is standard for use with replaceable power supply devices such as a battery charger. The coaxial connector (which may be other than a coaxial connector, but is preferably a coaxial connector) is adapted for the particular type of appliance. The bilaterally symmetric connector provides the same lead connections irrespective of its orientation, for convenience. Also, the bilaterally symmetric connector is very different in shape to avoid confusion that would occur if both ends had (differently sized) coaxial connectors.

WO 02/43192 A2



European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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.

Published:

- *without international search report and to be republished upon receipt of that report*
- *entirely in electronic form (except for this front page) and available upon request from the International Bureau*

DESCRIPTION

Dual Orientation Connector

5 Field of the Invention

The present invention relates to electrical connectors for electrically connecting at least one electronic device, such as a rechargeable battery, to a second electronic device acting as a load. More particularly, the invention relates to a connecting cable in which connectors are provided that are symmetric and of different shapes to avoid being
10 confusing to the user.

Background of the Invention

Connector cords for connecting power supplies to appliances are known. Also known are connectors, for such cords, which have coaxial connectors. The latter allow the
15 user to plug in a cord without worrying about orientating the connector properly. It would be desirable to preserve the ease of use of coaxial connectors when a cable is required to have connectors at both ends, for example, to permit a power supply and a load to be interchanged at either end. However, it is easy for a user to mix the ends up unless they happen to be the same size, which cannot be predetermined since the load and the power
20 supply may be made by different manufacturers.

Summary of the Invention

Briefly, an adapter cord for use with a power supply provides a coaxial connector on one end and a bilaterally symmetric connector on the other end. The coaxial connector
25 is adapted for connection to a load and the bilaterally symmetric connector is adapted for use with a power supply. The bilaterally symmetric connector is standard for use with replaceable power supply devices such as a battery charger. The coaxial connector (which may be other than a coaxial connector, but is preferably a coaxial connector) is adapted for the particular type of appliance. The bilaterally symmetric connector provides the same
30 lead connections irrespective of its orientation, for convenience. Also, the bilaterally

CONFIRMATION COPY

symmetric connector is very different in shape to avoid confusion that would occur if both ends had (differently sized) coaxial connectors.

A connector that provides a benefit of coaxial connectors, but which is shaped substantially differently, is provided. The difference in shape allows the connection of a power supply to a load using a connection cord which acts as an adapter. That is, the cord has a respective connector for each device at either end of the cord. Since most loads, such as cell phones and radios, have coaxial female connectors for their power supply inputs, the connector of the invention provides a non-coaxial connector at the other end. However, the connector is designed such that it does not matter which way it is oriented when inserted. The connector is bilaterally symmetric with one contact in the center flanked by two lateral contacts on either side. The lateral contacts are electrically interconnected so that it does not matter which of two orientations are chosen by the user when the user plugs it into a mating connection on the power supply.

The connectors are shaped to mate with each other in at least two alternative orientations. In one embodiment of the invention, a connector contains three pins. The pins are arranged in a single row, with the center pin (pin 2) being connected to one pole of the load connector (presumably coaxial at the other end of the connecting cable) and the two end pins (pins 1 and 3) being connected to the other pole of the load. As a result of this arrangement, the power supply connector can be mated with a corresponding female connector in either of two different orientations without reversing polarity. In an alternative embodiment, four pins are used with a center pair being electrically connected together. The redundancy of pins provides some insurance against breakage due to mishandling.

In an additional alternative embodiment, the connectors can be used as signal lines to relay an electrical signal, instead of DC power. In another alternative embodiment of the invention, each connector has 5 electrical leads (numbered in the same fashion as in the embodiment above). The electrical leads are arranged such that electrical leads 1 and 5 are used to carry a positive charge; leads 2 and 4 are used to carry a negative charge; and lead 3 is used to carry a signal between the two devices that the connector connects. As in the previous embodiment, the connectors can be mated in two alternative orientations without

affecting the ultimate result, with leads 1, 2, 3, 4, and 5 of a first connector matching with either leads 1, 2, 3, 4, and 5 or leads 5, 4, 3, 2, and 1 of a second connector.

While the invention will now be described in connection with a certain preferred embodiment and in reference to the appended figure, the described embodiment is not intended to limit the invention to this particular embodiment. On the contrary, it is intended to cover all alternative, modifications, and equivalents as may be included in the scope of the invention. Thus the following description and example of the preferred embodiment of the invention are only intended to illustrate the practice of the present invention. The particular embodiment are shown by way of an example and for the purpose of illustrative discussion of a preferred embodiment of the present invention. This particular embodiment is presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the invention. In this regard, no attempt is made to show structural details of the invention in more detail than is necessary for a fundamental understanding of the invention. The description, taken with the drawing, make it apparent to those skilled in the art how the several forms of the invention may be embodied in practice.

Brief Description of the Drawings

FIG. 1 is an isometric view of one embodiment of the invention.

FIG. 2 is a different isometric view of the embodiment of FIG. 1.

FIG. 3 is an alternative embodiment of the invention.

Detailed Description of the Illustrated Embodiments

Referring now to FIGS. 1 and 2, a first connector 10 is attached to a cable 15 with two insulated wires, 15a, 15b. The first insulated wire 15a is connected to the negative pole of a connector for the load (not shown in the drawing). The second insulated wire 15b is connected to the positive pole of the load connector.

Within a housing 25 of the connector 10 are three female jacks 20a, 20b, and 20c. The outer jacks 20a and 20c are electrically connected to the first wire 15a. The inner jack 20b is electrically connected to the second wire 15b. On a power supply, three pins 30a,

30b, 30c are mounted and electrically connected to a PC board 35. The PC board 35 electrically connects the first pin 30a with the third pin 30b. The pins 30a, 30b, 30c of the PC board are shaped to mate with the jacks 20a, 20b, 20c of the connector 10. The connection of the PC board to the pins 30a, 30b, 30c is such as to connect one or both of the outboard pins 30a and 30c with the negative pole of the power supply and the middle pin 30b with the positive pole of the power supply. In the first orientation, the pins 30a, 30b, 30c are inserted into the three sockets 20a, 20b, 20c, respectively. In the second orientation, the outer pins 20a, 20c are inserted in the outer pins 30c, 30a, respectively. When inserted into the sockets 20a, 20b, 20c, the connectors provide for the electrical communication between the two electronic devices. Thus, the positive pole of the power supply is connected to the positive pole of the (preferably coaxial) load connector regardless of the orientation of the connector 10.

Note that the poles of the power supply may be interchanged without departing from the scope of the invention. That is, the positive pole of the power supply could be connected to the lateral pins 30a and 30c and the negative pole to the middle pin 30b with corresponding substitutions in the connector 10. Also note that preferably the shape of the connector 10 housing 25 is distinctive so as not to be confused with a coaxial or other type of connector at the opposite end of the cable 15.

Referring now to FIG. 3, a female connector 40 is attached to a cable 45 with two insulated wires 45a, 45b. The first and second insulated wires 45a, 45b are connected to a first electronic device (not shown). The first insulated wire 45a is designed to transmit a first signal from the first electronic device to a second electronic device. The second insulated wire 45b is designed to transmit a second signal from the second electronic device to the first electronic device.

Within a housing 55 of the female connector 40 are five female jacks (not shown) arranged such that the center jack is surrounded by the remaining four outer jacks. The four outer jacks are arranged to be equidistant from the center jack and to form four corners of a square with the center jack at its center.

Connected to the second electronic device is a PC board 60 having 5 pins 65a, 65b, 65c, 65d, and 65e. The pins 65a, 65b, 65c, 65d, 65e are arranged and spaced to mate with

the five jacks of the female connector, with the center pin 65a mating with the center jack of the female connector. The outer jacks 65b, 65c, 65d, 65e are electrically connected with each other through the PC board 60.

5 Regardless of the orientation of the mating between the female connector and the PC board, an operable connection is achieved as long as the center pin mates with the center jack and at least one of the outer pins mate with at least one of the outer jacks of the female connector. In the event that one or more of the outer pins is damaged or breaks off from the PC board, a connection can still be achieved through the other operable outer pins.

10 It will be evident to those skilled in the art that the invention is not limited to the details of the foregoing illustrative embodiments, and that the present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended
15 claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

Claims:

1. An electrical adapter for powering an electronic device comprising:
a first connector having first and second poles;
a second connector having first and second poles;
5 said second connector first pole being connected by a first wire to said first
connector first pole and said second connector second pole being connected by a second
wire to said first connector second pole;
said second connector first and second poles being electrically connected to
respective ones of at least one of a row of contacts matable with a row of contacts on a
10 power supply such that first and second poles of said power supply are connected to said
first and second poles regardless of which of two bipolarly symmetric orientations is
assumed in mating said row second connector row of contacts with said power supply row
of contacts.
2. The adapter of claim 1, wherein:
15 said second connector row of contacts being one of a row of jacks and a row of
pins and said power supply row of contacts being the other of a row of jacks and a row of
pins.
3. The adapter of claim 2, wherein said first connector is a coaxial connector.
4. The adapter of claim 1, wherein said first connector is a coaxial connector

1/3

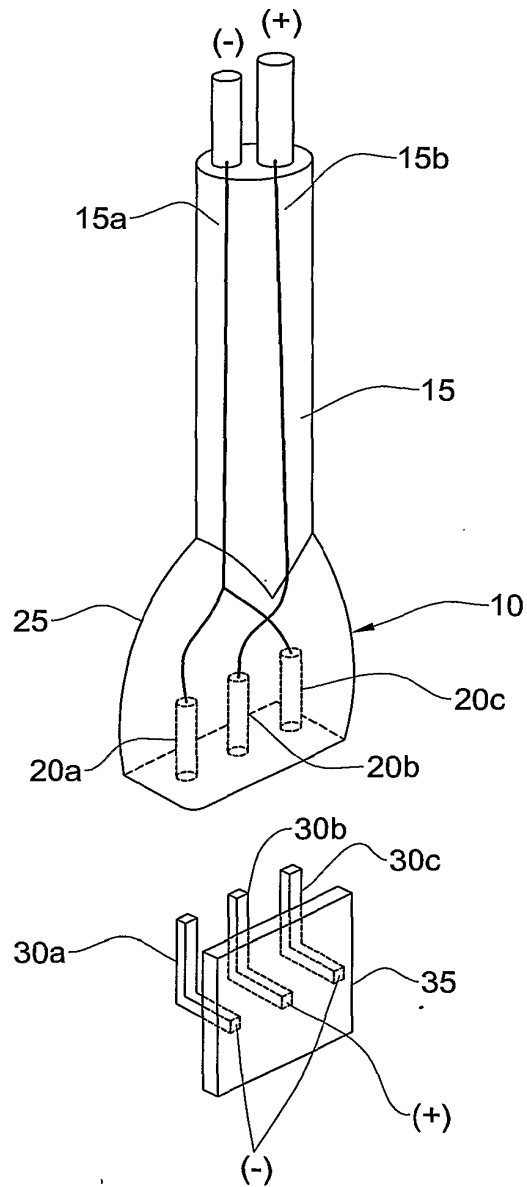


FIG. 1

SUBSTITUTE SHEET (RULE 26)

2/3

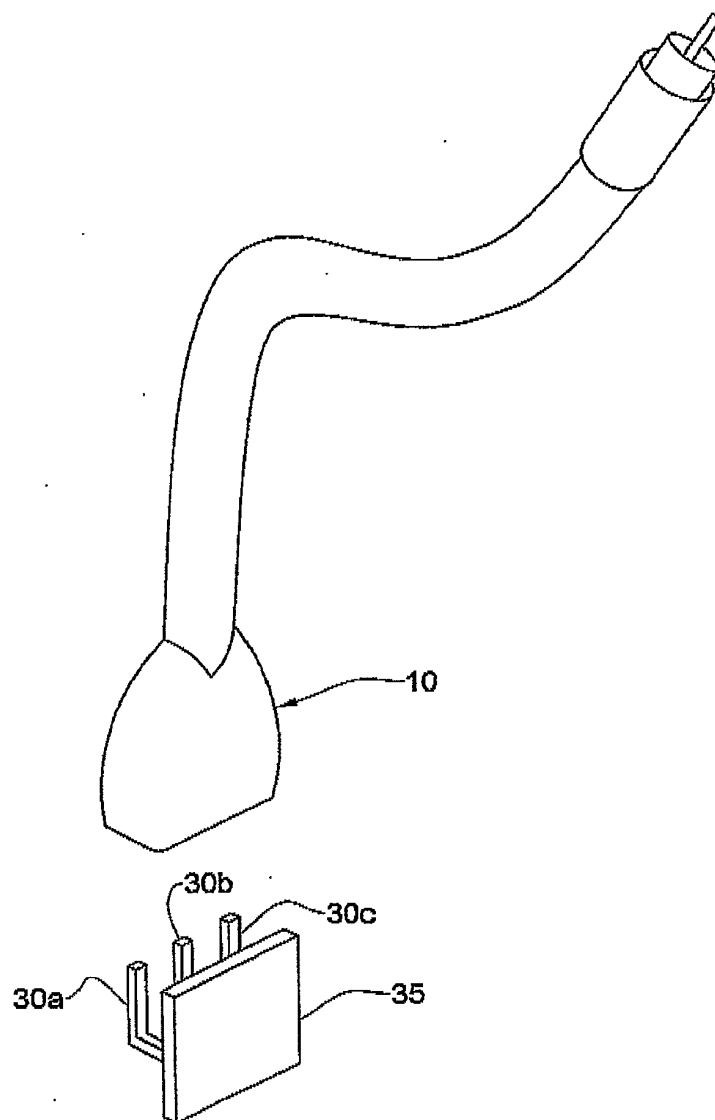


FIG. 2

RECTIFIED SHEET (RULE 91)
ISA/EP

3/3

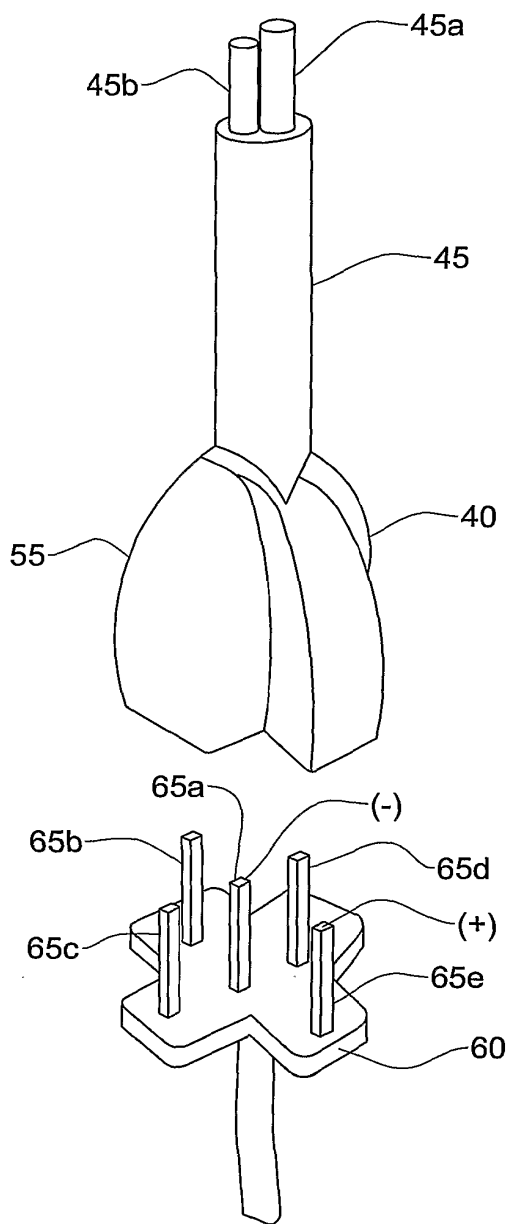
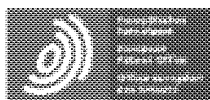


FIG. 3

SUBSTITUTE SHEET (RULE 26)



Espacenet

Bibliographic data: KR20070039956 (A) — 2007-04-13

REVERSIBLE UNIVERSAL SERIAL BUS (USB) DEVICE AND CONNECTOR

Inventor(s): TEICHER MORDECHAI [IL] ± (TEICHER MORDECHAI)**Applicant(s):** MSYSTEMS LTD [IL] ± (MSYSTEMS LTD)

Classification: - **international:** G06F1/16; G06K19/07; H01R27/00
 - **cooperative:** H01R13/08 (KR); H01R13/26 (KR); H01R13/6469 (EP, KR, US); H01R13/6591 (EP, KR, US); H01R27/00 (EP, KR, US); H01R29/00 (EP, KR, US); H01R31/065 (EP, KR, US); G06F2213/0042 (KR); H01R13/08 (EP, US); H01R13/26 (EP, US); H01R2201/06 (EP, KR, US); Y10S439/954 (EP, KR, US)

Application number: KR20077004062 20070221 Global Dossier

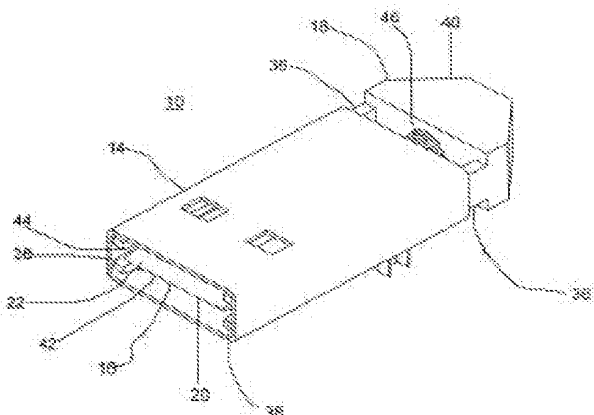
Priority number(s): US20040592517P 20040802

Also published as: CN101015096 (A) EP1784896 (A2) EP1784896 (A4) JP2008508694 (A) US2006024997 (A1) more

Abstract not available for KR20070039956 (A)

Abstract of corresponding document: US2006024997 (A1)

A reversible connector for coupling with a USB A-type standard connector, including a first set of four electrical contact regions and a second set of four electrical contact regions, the contact regions configured such that in a first coupling orientation of the reversible connector with the standard connector, only the first set of electrical contact regions is mechanically connected with the contacts of the standard connector and in a second coupling orientation of the reversible connector with the standard connector, only the second set of electrical contact regions is mechanically connected with the contacts of the standard connector. Also provided are corresponding reversible USB devices and appliances based upon the aforementioned reversible connectors.





(19)대한민국특허청(KR)
(12) 공개특허공보(A)

(51) . Int. Cl.

H01R 27/00 (2006.01)

G06K 19/07 (2006.01)

G06F 1/16 (2006.01)

(11) 공개번호 10-2007-0039956

(43) 공개일자 2007년04월13일

(21) 출원번호	10-2007-7004062	(87) 국제공개번호	WO 2006/013553
(22) 출원일자	2007년02월21일		
심사청구일자	없음		
번역문 제출일자	2007년02월21일		
(86) 국제출원번호	PCT/IL2005/000742	국제공개일자	2006년02월09일
국제출원일자	2005년07월13일		

(30) 우선권주장 60/592,517 2004년08월02일 미국(US)

(71) 출원인
엠시스템스 리미티드
이스라엘 44425 크파 사바 야텔 에다 스트리트 7

(72) 발명자
테이처 모르드개
이스라엘 45314 호드 하샤론 모타 풀 스트리트 6

(74) 대리인
송봉식
정삼영
박종혁
김정옥

전체 청구항 수 : 총 49 항

(54) 가역 유니버설 시리얼 버스(USB) 디바이스 및 커넥터

(57) 요약

USB A형 스탠더드 커넥터와 결합하기 위한 가역 커넥터가 제공된다. 상기 가역 커넥터는 제1 세트의 4개의 전기 콘택트 영역 및 제2 세트의 4개의 전기 콘택트 영역을 포함하고, 상기 콘택트 영역들은, 상기 스탠더드 커넥터와의 상기 가역 커넥터의 제1 결합 방향으로 오직 제1 세트의 전기 콘택트 영역만이 상기 스탠더드 커넥터의 콘택트와 기계적으로 접속되어 있고 상기 스탠더드 커넥터와의 상기 가역 커넥터의 제2 결합 방향으로 오직 제2 세트의 전기 콘택트 영역만이 상기 스탠더드 커넥터의 콘택트와 기계적으로 접속되어 있도록 구성되어 있다. 또한 상술된 가역 커넥터에 기초하여 상응하는 가역 USB 디바이스 및 어플라이언스가 제공된다.

대표도

도 1a

특허청구의 범위

청구항 1.

USB A형 스탠더드 커넥터와 결합하기 위한 가역 커넥터에 있어서, 상기 USB A형 스탠더드 커넥터는 중공부, 상기 중공부의 일측상에 배치된 4개의 전기 콘택트의 고정된 세트 및 상기 중공부의 3개의 측상에 배치된 전기 도전 실드를 갖고 있고, 상기 가역 커넥터는 제1 세트의 4개의 전기 콘택트 영역 및 제2 세트의 4개의 전기 콘택트 영역을 포함하고, 상기 제1 세트의 4개의 전기 콘택트 영역 및 제2 세트의 4개의 전기 콘택트 영역은,

(a) 상기 USB A형 스탠더드 커넥터와의 상기 가역 커넥터의 제1 결합 방위로, 상기 제1 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접속되고,

(b) 상기 USB A형 스탠더드 커넥터와의 상기 가역 커넥터의 제2 결합 방위로, 상기 제2 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접속되도록 구성되어 있는 것을 특징으로 하는 가역 커넥터.

청구항 2.

제1항에 있어서, 상기 제1 결합 방위로, 상기 제2 세트의 4개의 전기 콘택트 영역의 적어도 하나의 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트로부터 분리되어 있는 것을 특징으로 하는 가역 커넥터.

청구항 3.

제1항에 있어서, 상기 제2 결합 방위로, 상기 제1 세트의 4개의 전기 콘택트 영역의 적어도 하나의 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트로부터 분리되어 있는 것을 특징으로 하는 가역 커넥터.

청구항 4.

제1항에 있어서, 상기 가역 커넥터는 플러그이고 상기 USB A형 스탠더드 커넥터는 USB A형 리셉터클인 것을 특징으로 하는 가역 커넥터.

청구항 5.

제1항에 있어서, 상기 가역 커넥터는 리셉터클이고 상기 USB A형 스탠더드 커넥터는 USB A형 플러그인 것을 특징으로 하는 가역 커넥터.

청구항 6.

제1항에 있어서, 위에 4개의 터미널이 배치된 인쇄회로기판 인터페이스 커넥터 배열부를 더 포함하고, 상기 4개의 터미널의 각각은 인쇄회로기판에 접속하도록 구성되어 있고, 상기 인쇄회로기판 커넥터 배열부는 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역의 전기적으로 상응하는 콘택트 영역을 상기 터미널에 전기적으로 접속시키기 위해 전자 스위칭 배열부에 접속되어 있는 것을 특징으로 하는 가역 커넥터.

청구항 7.

제1항에 있어서, 위에 4개의 터미널이 배치된 인쇄회로기판 인터페이스 커넥터 배열부를 더 포함하고, 상기 4개의 터미널의 각각은 인쇄회로기판에 접속하도록 구성되어 있고, 상기 인쇄회로기판 커넥터 배열부는 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역의 전기적으로 상응하는 콘택트 영역을 상기 터미널에 전기적으로 접속시키기 위한 크로스오버 배열부를 갖고 있는 것을 특징으로 하는 가역 커넥터.

청구항 8.

제1항에 있어서, 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역은,

- (a) 상기 제1 세트의 4개의 전기 콘택트 영역을 갖는 제1 메이저 사이드; 및
- (b) 상기 제2 세트의 4개의 전기 콘택트 영역을 갖는 제2 메이저 사이드;를 포함하는 텅 배열부상에 배치되어 있는 것을 특징으로 하는 가역 커넥터.

청구항 9.

제8항에 있어서, 상기 텅 배열부는 상기 제2 세트의 4개의 전기 콘택트 영역로부터 상기 제1 세트의 4개의 전기 콘택트 영역을 전기적으로 절연시키는 중앙 절연층을 포함하는 것을 특징으로 하는 가역 커넥터.

청구항 10.

제9항에 있어서, 상기 중앙 절연층은 복수의 그루브를 포함하고 있고, 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역은 상기 그루브내에 홈을 갖고 있는 것을 특징으로 하는 가역 커넥터.

청구항 11.

제9항에 있어서, 상기 중앙 절연층은 실질상 강성을 갖는 것을 특징으로 하는 가역 커넥터.

청구항 12.

제9항에 있어서, 상기 텅 배열부는 상기 USB A형 스탠더드 커넥터의 중공부내에 상기 텅 배열부를 센터링하도록 구성된 복수의 돌출부를 위에 포함하고 있는 것을 특징으로 하는 가역 커넥터.

청구항 13.

제9항에 있어서, 상기 텅 배열부는 상기 USB A형 스탠더드 커넥터의 중공부내에 상기 텅 배열부의 측방향 이동을 감소시키도록 구성된 복수의 돌출부를 위에 포함하고 있는 것을 특징으로 하는 가역 커넥터.

청구항 14.

제9항에 있어서, 상기 텅 배열부는 복수의 돌출부를 포함하고 있고, 상기 돌출부중 하나는 상기 제1 메이저 사이드상에 배치되어 있고 상기 돌출부중 다른 하나는 상기 제2 메이저 사이드상에 배치되어 있고, 상기 돌출부는 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역중 적어도 하나가 상기 USB A형 스탠더드 커넥터의 실드와 전기 접촉하는 것을 방지하도록 구성된 것을 특징으로 하는 가역 커넥터.

청구항 15.

제8항에 있어서,

- (a) 상기 제1 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접촉하도록 상기 제1 결합 방위로 상기 제1 세트의 4개의 전기 콘택트 영역을 편향시키고,
- (b) 상기 제2 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접촉하도록 상기 제2 결합 방위로 상기 제2 세트의 4개의 전기 콘택트 영역을 편향시키도록 구성된 콘택트 상승 배열부를 더 포함하는 것을 특징으로 하는 가역 커넥터.

청구항 16.

제15항에 있어서, 상기 텅 배열부는 상기 제1 세트의 4개의 전기 콘택트 영역을 상기 제2 세트의 전기 콘택트 영역으로부터 전기 절연시키는 중앙 절연층을 포함하는 것을 특징으로 하는 가역 커넥터.

청구항 17.

제16항에 있어서, 상기 중앙 절연층은 복수의 그루브를 포함하고, 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역은 상기 그루브내에 홈을 갖고 있는 것을 특징으로 하는 가역 커넥터.

청구항 18.

제15항에 있어서, 상기 중앙 절연층은 실질상 강성을 갖고 있는 것을 특징으로 하는 가역 커넥터.

청구항 19.

제8항에 있어서, 슬리브를 더 포함하고 있고, 상기 텅 배열부는 상기 슬리브내에 중앙에 배치되어 있고, 상기 텅 배열부는 구부림가능부를 포함하고 있고, 상기 텅 배열부는 상기 텅 배열부 및 상기 스탠더드 커넥터가 결합됨에 따라,

- (a) 상기 제1 결합 방위로, 오직 상기 제1 세트의 4개의 전기 콘택트 영역만이 상기 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접촉하도록 상기 텅 배열부가 상기 스탠더드 커넥터에 의해 제1 방향으로 이동되고,
- (b) 상기 제2 결합 방위로, 오직 상기 제2 세트의 4개의 전기 콘택트 영역만이 상기 스탠더드 커넥터의 전기 콘택트의 세트와 기계적 접촉 상태에 있도록 상기 텅 배열부가 상기 스탠더드 커넥터에 의해 제2 방향으로 이동되도록 구성되어 있는 것을 특징으로 하는 가역 커넥터.

청구항 20.

제19항에 있어서,

- (a) 상기 제1 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접촉하도록 상기 제1 결합 방위로 상기 제1 세트의 4개의 전기 콘택트 영역을 편향시키고,

(b) 상기 제2 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접촉하도록 상기 제2 결합 방위로 상기 제2 세트의 4개의 전기 콘택트 영역을 편향시키도록 구성된 콘택트 상승 배열부를 더 포함하는 것을 특징으로 하는 가역 커넥터.

청구항 21.

제19항에 있어서, 상기 텅 배열부는 상기 제1 세트의 4개의 전기 콘택트 영역을 상기 제2 세트의 전기 콘택트 영역으로부터 전기 절연시키는 중앙 절연층을 포함하는 것을 특징으로 하는 가역 커넥터.

청구항 22.

제21항에 있어서, 상기 중앙 절연층은 복수의 그루브를 포함하고, 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역은 상기 그루브내에 홈을 갖고 있는 것을 특징으로 하는 가역 커넥터.

청구항 23.

제19항에 있어서, 상기 텅 배열부와 상기 스탠더드 커넥터가 접촉하기 전에 상기 슬리브내에서 상기 텅 배열부를 중앙에 유지시키도록 구성된 센터링 메커니즘을 더 포함하는 것을 특징으로 하는 가역 커넥터.

청구항 24.

제23항에 있어서, 상기 센터링 메커니즘은 상기 센터링 메커니즘이 상기 스탠더드 커넥터와 초기 접촉할 때 상기 센터링 메커니즘을 해제하여 상기 텅 배열부의 이동을 허용하도록 구성된 것을 특징으로 하는 가역 커넥터.

청구항 25.

제24항에 있어서, 상기 센터링 메커니즘은 스프링 리코일드 슬라이딩 로킹 메커니즘을 포함하고 있는 것을 특징으로 하는 가역 커넥터.

청구항 26.

제19항에 있어서, 상기 텅 배열부는 적어도 4개의 금속 스트립을 포함하는 금속 스트립의 세트를 포함하고 있고, 상기 제1 및 제2 세트의 콘택트 영역은 상기 금속 스트립의 영역에 의해 제공되고, 상기 금속 스트립의 세트는 상기 텅 배열부의 주요 구조적 엘리먼트를 형성하는 것을 특징으로 하는 가역 커넥터.

청구항 27.

제26항에 있어서, 상기 금속 스트립의 세트는 상기 구부림가능부가 상기 텅 배열부의 대부분을 포함하도록 리프 스프링으로서 기능하는 것을 특징으로 하는 가역 커넥터.

청구항 28.

제26항에 있어서, 상기 금속 스트립의 세트는 적어도 상기 제1 세트의 전기 콘택트 영역을 제공하는 4개의 금속 스트립의 제1 그룹 및 상기 제2 전기 콘택트 영역의 세트를 제공하는 4개의 금속 스트립의 제2 그룹을 포함하고, 상기 금속 스트립의 제1 그룹은 상기 금속 스트립의 제2 그룹으로부터 전기 절연되어 있는 것을 특징으로 하는 가역 커넥터.

청구항 29.

제28항에 있어서, 4개의 터미널이 위에 배치된 인쇄회로기판 인터페이스 커넥터 배열부를 더 포함하고, 상기 4개의 터미널의 각각은 인쇄회로기판에 접속하도록 구성되어 있고, 상기 인쇄회로기판 커넥터 배열부는 상기 제1 세트의 전기 콘택트 영역 및 상기 제2 세트의 전기 콘택트 영역의 전기적으로 상응하는 콘택트 영역을 상기 터미널에 전기적으로 접속하기 위한 크로스오버 배열부를 갖고 있는 것을 특징으로 하는 가역 커넥터.

청구항 30.

제26항에 있어서, 상기 텅 배열부의 상기 스탠더드 커넥터와의 결합 방위에 따라 상기 리프 스프링 전기 콘택트 배열부로부터 전기 신호를 루팅하도록 구성된 전자 스위칭 배열부를 더 포함하는 것을 특징으로 하는 가역 커넥터.

청구항 31.

제26항에 있어서, 상기 텅 배열부는 팁을 갖고 있고, 상기 텅 배열부는 상기 팁에 배치된 절연 캡을 포함하고, 상기 절연 캡은 상기 리프 스프링 전기 콘택트 배열부와 상기 슬리브 사이의 전기 접촉을 방지하도록 구성된 것을 특징으로 하는 가역 커넥터.

청구항 32.

제26항에 있어서, 상기 텅 배열부가 상기 스탠더드 커넥터의 증공부와 결합됨에 따라 상기 텅 배열부를 상기 스탠더드 커넥터의 콘택트의 세트쪽으로 향하도록 구성되어 있는 텅 기동기를 더 포함하는 것을 특징으로 하는 가역 커넥터.

청구항 33.

제32항에 있어서, 상기 텅 배열부는 팁을 갖고 있고, 상기 텅 배열부는 상기 팁에 배치된 절연 캡을 포함하고, 상기 텅 배열부는,

(a) 상기 텅 배열부가 상기 증공부와 결합됨에 따라 상기 리프 스프링 전기 콘택트 배열부와 상기 스탠더드 커넥터의 실드 사이의 전기 접촉을 방지하고,

(b) 상기 배열부가 상기 증공부와 결합될 때 상기 리프 스프링 전기 콘택트 배열부와 상기 스탠더드 커넥터의 콘택트의 세트 사이를 전기 접촉하도록 구성된 것을 특징으로 하는 가역 커넥터.

청구항 34.

제1항에 있어서,

(a) 슬리브; 및

(b) 상기 슬리브내에 서로 인접하여 미끄러짐가능하게 장착된 한 쌍의 블록;을 더 포함하고,

상기 블록은 동작 위치선과 수축 위치선 사이에서 독립적으로 미끄러지도록 구성되어 있고, 상기 블록은 또한, 제1 블록 및 제2 블록을 포함하고, 상기 제1 블록에는 상기 제1 세트의 4개의 전기 콘택트가 위에 배치되어 있고, 상기 제2 블록에는 상기 제2 세트의 4개의 전기 콘택트가 위에 배치되어 있는 것을 특징으로 하는 가역 커넥터.

청구항 35.

제34항에 있어서, 상기 블록을 상기 동작 위치선으로 복원하도록 구성된 복원 배열부를 더 포함하는 것을 특징으로 하는 가역 커넥터.

청구항 36.

제35항에 있어서, 상기 복원 배열부는 2개의 나선형 스프링을 포함하고, 상기 블록은 폭 및 두께를 갖고 있고, 상기 나선형 스프링의 각각은 상기 두께보다 큰 외경을 갖고 있는 것을 특징으로 하는 가역 커넥터.

청구항 37.

제34항에 있어서, 상기 블록의 각각은 복수의 그루브를 포함하고, 상기 제1 세트의 전기 콘택트 및 상기 제2 세트의 전기 콘택트는 상기 그루브내에 홈을 갖고 있는 것을 특징으로 하는 가역 커넥터.

청구항 38.

제34항에 있어서, 전기 터미널의 세트가 안에 배치된 하우징을 더 포함하고, 상기 전기 터미널의 세트 및 상기 제1 세트의 전기 콘택트는,

(a) 상기 제1 블록이 상기 동작 위치선에 있을 때 상기 전기 터미널의 세트가 상기 제1 세트의 전기 콘택트와 전기 접촉하고,

(b) 상기 제1 블록이 상기 수축 위치선에 있을 때 상기 전기 터미널의 세트가 상기 제1 세트의 전기 콘택트와 전기 절연되도록 구성된 것을 특징으로 하는 가역 커넥터.

청구항 39.

제34항에 있어서,

(a) 상기 제1 세트의 콘택트 영역이 상기 스탠더드 커넥터의 전기 콘택트의 세트와 기계 접촉하도록 상기 제1 세트의 콘택트 영역이 상기 제1 결합 방향으로 상기 제1 블록으로부터 떨어져 상승하고,

(b) 상기 제2 세트의 콘택트 영역이 상기 스탠더드 커넥터의 전기 콘택트의 세트와 기계 접촉하도록 상기 제2 세트의 콘택트 영역이 상기 제2 결합 방향으로 상기 제2 블록으로부터 떨어져 상승하도록 구성된 콘택트 상승 배열부를 더 포함하는 것을 특징으로 하는 가역 커넥터.

청구항 40.

제39항에 있어서, 제1 레버 배열부 및 제2 레버 배열부를 더 포함하고, 상기 제1 레버 배열부는 상기 제1 세트의 콘택트에 기계적으로 접속되어 있고, 상기 제2 레버 배열부는 상기 제2 세트의 콘택트에 기계적으로 접속되어 있고, 상기 제1 레버 배열부 및 상기 제2 레버 배열부는 상기 스탠더드 커넥터에 의한 기동에 응답하여 상기 제1 세트의 콘택트 및 상기 제2 세트의 콘택트를 각각 상승시키도록 구성되어 있는 것을 특징으로 하는 가역 커넥터.

청구항 41.

제40항에 있어서, 상기 제1 블록은 상기 제1 블록 및 상기 제2 블록의 상대 이동 동안 상기 제1 레버 배열부의 적어도 일부를 수용하도록 구성된 적어도 하나의 그루브를 안에 갖고 있고, 상기 제2 블록은 상기 제1 블록 및 상기 제2 블록의 상대 이동 동안 상기 제2 레버 배열부의 적어도 일부를 수용하도록 구성된 적어도 하나의 그루브를 안에 갖고 있는 것을 특징으로 하는 가역 커넥터.

청구항 42.

어플라이언스와 2개의 망위에서 맞물리기 위한 가역 USB 디바이스에 있어서, 상기 어플라이언스는 스탠더드 USB A형 리셉터클을 갖고 있고, 상기 가역 USB 디바이스는,

- (a) 기능 유닛;
- (b) 상기 기능 유닛을 포함하는 본체; 및
- (c) 상기 본체로부터 돌출하도록 회전불가능하도록 결합된 가역 플러그;를 포함하고, 상기 가역 플러그는 2개의 결합 방식으로 상기 스탠더드 USB A형 리셉터클과 동작식 결합하도록 적용된 것을 특징으로 하는 가역 USB 디바이스.

청구항 43.

어플라이언스와 2개의 망위에서 맞물리기 위한 가역 USB 디바이스에 있어서, 상기 어플라이언스는 스탠더드 USB A형 리셉터클을 갖고 있고, 상기 스탠더드 USB A형 리셉터클은 고정된 세트의 4개의 전기 콘택트를 갖고 있고, 상기 가역 USB 디바이스는,

- (a) 기능 유닛;
- (b) 상기 기능 유닛을 포함하는 본체; 및
- (c) 상기 스탠더드 USB A형 리셉터클과 결합하기 위하여 상기 본체로부터 돌출하도록 회전불가능하도록 결합된 가역 플러그;를 포함하고, 상기 가역 플러그는 제1 세트의 4개의 전기 콘택트 영역 및 제2 세트의 4개의 전기 콘택트 영역을 포함하고, 상기 제1 및 제2 세트의 4개의 전기 콘택트 영역은,
 - (i) 상기 스탠더드 리셉터클과의 상기 가역 플러그의 제1 결합 방식으로, 상기 제1 세트의 전기 콘택트 영역이 상기 스탠더드 리셉터클의 전기 콘택트의 세트와 기계적으로 접속되어 있고,
 - (ii) 상기 스탠더드 리셉터클과의 상기 가역 플러그의 제2 결합 방식으로, 상기 제2 세트의 전기 콘택트 영역이 상기 스탠더드 리셉터클의 전기 콘택트의 세트와 기계적으로 접속되어 있도록 구성된 것을 특징으로 하는 가역 USB 디바이스.

청구항 44.

제43항에 있어서, 상기 제1 결합 방식으로, 상기 제2 세트의 전기 콘택트 영역의 적어도 하나의 콘택트 영역이 상기 USB 어플라이언스의 스탠더드 커넥터의 전기 콘택트의 세트로부터 분리되어 있는 것을 특징으로 하는 가역 USB 디바이스.

명세서

제47항에 있어서, 상기 제2 결합 방향으로, 상기 제1 세트의 전기 콘택트 영역의 적어도 하나의 콘택트 영역이 상기 스텐더드 플러그의 전기 콘택트의 세트로부터 분리되어 있는 것을 특징으로 하는 가역 USB 어플라이언스.

청구항 49.

제47항에 있어서, 상기 제1 결합 방향으로, 상기 제2 세트의 전기 콘택트 영역의 적어도 하나의 콘택트 영역이 상기 스텐더드 플러그의 전기 콘택트의 세트로부터 분리되어 있는 것을 특징으로 하는 가역 USB 어플라이언스.

청구항 48.

(ii) 상기 가역 리셉터클과의 상기 스텐더드 플러그의 제2 결합 방향으로, 상기 제2 세트의 전기 콘택트 영역이 상기 스텐더드 플러그의 전기 콘택트의 세트와 기계적으로 접속되어 있고, 및

(i) 상기 가역 리셉터클과의 상기 스텐더드 플러그의 제1 결합 방향으로, 상기 제1 세트의 전기 콘택트 영역이 상기 스텐더드 플러그의 전기 콘택트의 세트와 기계적으로 접속되어 있고,

(c) 상기 스텐더드 USB A형 플러그와 결합하도록 상기 본체에 회전불가능하게 결합된 가역 리셉터클;을 포함하고, 상기 가역 리셉터클은 제1 세트의 4개의 전기 콘택트 영역 및 제2 세트의 4개의 전기 콘택트 영역을 포함하고, 상기 제1 및 제2 세트의 4개의 전기 콘택트 영역은,

(b) 상기 기는 유닛을 포함하는 본체; 및

(a) 기는 유닛;

스텐더드 USB A형 플러그를 갖고 있는 디바이스를 2개의 방향으로 수신하는 가역 USB 어플라이언스에 있어서, 상기 스텐더드 USB A형 플러그는 고정된 세트의 4개의 전기 콘택트를 갖고 있고, 상기 가역 USB 어플라이언스는,

청구항 47.

(c) 상기 스텐더드 USB A형 플러그와 상기 2개의 결합 방향으로 동작식 결합하도록 상기 본체에 회전불가능하게 결합된 가역 리셉터클;을 포함하는 것을 특징으로 하는 가역 USB 어플라이언스.

(b) 상기 기는 유닛을 포함하는 본체; 및

(a) 기는 유닛;

스텐더드 USB A형 플러그를 갖고 있는 디바이스를 2개의 방향으로 수신하는 가역 USB 어플라이언스에 있어서, 상기 가역 USB 어플라이언스는,

청구항 46.

제43항에 있어서, 상기 제2 결합 방향으로, 상기 제1 세트의 전기 콘택트 영역의 적어도 하나의 콘택트 영역이 상기 USB 어플라이언스의 스텐더드 커넥터의 세트로부터 분리되어 있는 것을 특징으로 하는 가역 USB 디바이스.

청구항 45.

기술분야

본 발명은 유니버설 시리얼 버스(USB) 디바이스에 관한 것이고, 특히, USB 호스트와 가역 결합하기 위한 USB 디바이스에 관한 것이다. 본 발명은 또한 가역 USB 커넥터에 관한 것이다.

배경기술

스탠더드 USB 플러그는 2개의 가능한 방위중 하나로 스탠더드 USB 리셉터클내에 삽입될 수 있을 뿐이다. 따라서, 상기 USB 플러그가 상기 USB 리셉터클에 대하여 부정확하게 방위지정되면, 상기 플러그 및 리셉터클은 결합될 수 없다. 디바이스상의 USB 리셉터클의 위치지정에 대한 아무런 표준도 없기 때문에 사용자는 자주 부정확한 방위로 리셉터클내로 상기 플러그를 삽입하려 시도할 것이다. USB 플러그가 USB 리셉터클로부터 자주 삽입되고 제거되는 상황에서, 이러한 예러는 사용자에게 상당히 불편할 수 있다. 또한, 많은 USB 디바이스는 상기 USB 디바이스의 본체로부터 직접 뻗는 USB 플러그를 가지고 있다. 이러한 USB 디바이스가 또 다른 포트를 갖는 호스트 어플라이언스의 USB 리셉터클에 접속될 때, 상기 USB 디바이스는 상기 호스트의 또 다른 포트로의 접근을 차단하고 다른 USB 디바이스가 상기 호스트 어플라이언스로 접속되는 것을 방지한다. 상기 USB 디바이스의 본체가 비대칭일 때, 즉 상기 USB 플러그가 상기 USB 디바이스의 사이드에 대하여 비대칭적으로 위치지정되는 경우에, 제1 방위로의 삽입은 이웃하는 포트를 차단할 수 있는데, 상기 디바이스를 반전된 방위로 삽입하는 것이 가능하다면 상기 삽입은 이웃하는 포트를 차단하지 않을 것이다. 또한, 비대칭 본체를 갖는 USB 디바이스의 경우에, 제1 방위로의 삽입은 상기 디바이스 및 상기 호스트 어플라이언스의 조합된 구조로 인해 가능하지 않을 수 있는데, 만약 상기 디바이스를 상이한 방위로 삽입하는 것이 가능하다면 상기 삽입은 가능할 수 있다.

본 발명과 관련되어 있는 것으로는 Stout의 미국 특허 제 6,394,813호가 있는데, Stout등은 주변 디바이스에 접속된 USB 커넥터 어댑터를 설명하고 있다. 이 어댑터는 호스트 디바이스에 대하여 주변 디바이스의 선택적인 재방위지정을 허용하도록 조정가능하다. 상술된 시스템의 단점은 상기 어댑터가 동일한 방위로 호스트 디바이스의 USB 커넥터내에 항상 삽입되는 것이 보장되어야 할 필요가 있다는데 있다.

또한, 본 발명과 관련되어 있는 것으로는 Yang의 미국 특허 제 6,733,329호가 있다. Yang은 주변 디바이스에 접속된 상호 교환가능한 USB 어댑터를 설명하고 있다. 이 USB 어댑터는 A형 USB 커넥터, B형 USB 커넥터 및 미니 타입의 USB 커넥터 사이에 상호교환가능하도록 구성되어 있다. 상술된 시스템의 단점은 상기 어댑터가 동일한 방위로 상기 호스트 디바이스의 USB 커넥터내로 삽입되어 있을 필요가 있다는 것이다. 상술된 시스템의 또 다른 단점은 상기 주변 디바이스가 접속될 때 상기 호스트 디바이스에 대하여 동일한 방위를 가지고 있어야 한다는 것이다.

또한, 본 발명과 관련되어 있는 것으로는, Yoo의 미국 공개 번호 제2003/0171035가 있다. Yoo는 인쇄회로기판의 양측상에 전기 터미널을 갖고 있는 인쇄회로기판을 갖고 있는 USB 주변 디바이스를 설명하고 있다. Yoo는 또한 일단부에서 스탠더드 USB 플러그 및 또 다른 일단부에서 위에 터미널을 가진 슬릿을 갖고 있는 어댑터를 설명하고 있다. 이 USB 주변 디바이스는 다음으로 어댑터의 슬릿내로 상기 인쇄회로기판을 삽입함으로써 어댑터에 접속된다. 이 인쇄회로기판은 2개의 방위로 슬릿내에 삽입될 수 있다. 상술된 시스템의 단점은 어댑터가 동일한 방위로 호스트 디바이스의 USB 커넥터내로 항상 삽입되는 것을 보장할 필요가 있다는 것이다. 상술된 시스템의 추가 단점은 상기 시스템이 사용하기에 편리하지 않다는 것이다. 상술된 시스템의 또 다른 단점은 인쇄회로기판이 가역 특징을 포함하도록 특별히 설계될 필요가 있다는 것이다.

따라서, 접속 이전, 동안 또는 그 후에 USB 플러그를 조정할 필요 없이 2개의 방위로 스탠더드 USB 리셉터클에 접속될 수 있는 신뢰할 만하고, 사용 용이하고 가역성을 갖는 USB 플러그가 필요하다. 또한, 접속 이전, 접속 동안 또는 그 후에 USB 플러그를 조정할 필요 없이 2개의 방위로 스탠더드 USB 플러그에 접속될 수 있는 신뢰할 만하고, 사용 용이하고 가역성을 갖는 USB 리셉터클이 필요하다. 또한, 접속 이전, 접속 동안 또는 그 후에 가역 디바이스를 조정할 필요없이 스탠더드 USB 리셉터클을 포함하는 어플라이언스에 2개의 방위로 접속하기 위한 가역 디바이스가 필요하다.

발명의 상세한 설명

본 발명은 가역 USB 디바이스 및 상응하는 커넥터 구성이다.

본 발명에 따라, USB A형 스탠더드 커넥터와 결합하기 위한 가역 커넥터가 제공되고, 상기 USB A형 스탠더드 커넥터는 중공부, 상기 중공부의 일측상에 배치된 4개의 전기 콘택트의 고정된 세트 및 상기 중공부의 3개의 측상에 배치된 전기 도

전 실드를 갖고 있고, 상기 가역 커넥터는 제1 세트의 4개의 전기 콘택트 영역 및 제2 세트의 4개의 전기 콘택트 영역을 포함하고, 상기 제1 세트의 4개의 전기 콘택트 영역 및 제2 세트의 4개의 전기 콘택트 영역은, (a) 상기 USB A형 스탠더드 커넥터와의 상기 가역 커넥터의 제1 결합 방위로, 상기 제1 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접속되고, 상기 제2 세트의 4개의 전기 콘택트 영역의 적어도 하나의 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트로부터 분리되어 있고, (b) 상기 USB A형 스탠더드 커넥터와의 상기 가역 커넥터의 제2 결합 방위로, 상기 제2 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접속되고, 상기 제1 세트의 4개의 전기 콘택트 영역의 적어도 하나의 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트로부터 분리되어 있도록 구성되어 있다.

본 발명의 또 다른 특징에 따라, 위에 4개의 터미널이 배치된 인쇄회로기판 인터페이스 커넥터 배열부를 또한 제공되고, 상기 4개의 터미널의 각각은 인쇄회로기판에 접속하도록 구성되어 있고, 상기 인쇄회로기판 커넥터 배열부는 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역의 전기적으로 상응하는 콘택트 영역을 상기 터미널에 전기적으로 접속시키기 위해 전자 스위칭 배열부에 접속되어 있다.

본 발명의 또 다른 특징에 따라, 위에 4개의 터미널이 배치된 인쇄회로기판 인터페이스 커넥터 배열부를 또한 제공되고, 상기 4개의 터미널의 각각은 인쇄회로기판에 접속하도록 구성되어 있고, 상기 인쇄회로기판 커넥터 배열부는 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역의 전기적으로 상응하는 콘택트 영역을 상기 터미널에 전기적으로 접속시키기 위한 크로스오버 배열부를 갖고 있다.

본 발명의 또 다른 특징에 따라, 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역은, (a) 상기 제1 세트의 4개의 전기 콘택트 영역을 갖는 제1 메이저 사이드; 및 (b) 상기 제2 세트의 4개의 전기 콘택트 영역을 갖는 제2 메이저 사이드;를 포함하는 텅(tongue) 배열부상에 배치되어 있다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부는 상기 제2 세트의 4개의 전기 콘택트 영역로부터 상기 제1 세트의 4개의 전기 콘택트 영역을 전기적으로 절연시키는 중앙 절연층을 포함한다.

본 발명의 또 다른 특징에 따라, 상기 중앙 절연층은 복수의 그루브를 포함하고 있고, 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역은 상기 그루브내에 홈을 갖고 있다.

본 발명의 또 다른 특징에 따라, 상기 중앙 절연층은 실질상 강성을 갖다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부는 상기 USB A형 스탠더드 커넥터의 중공부내에 상기 텅 배열부를 섀터링하도록 구성된 복수의 돌출부를 위해 포함하고 있다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부는 상기 USB A형 스탠더드 커넥터의 중공부내에 상기 텅 배열부의 측방향 이동을 감소시키도록 구성된 복수의 돌출부를 위해 포함하고 있다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부는 복수의 돌출부를 포함하고 있고, 상기 돌출부중 하나는 상기 제1 메이저 사이드상에 배치되어 있고 상기 돌출부중 다른 하나는 상기 제2 메이저 사이드상에 배치되어 있고, 상기 돌출부는 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역중 적어도 하나가 상기 USB A형 스탠더드 커넥터의 실드와 전기 접촉하는 것을 방지하도록 구성되어 있다.

본 발명의 또 다른 특징에 따라, (a) 상기 제1 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접속하도록 상기 제1 결합 방위로 상기 제1 세트의 4개의 전기 콘택트 영역을 편향시키고, (b) 상기 제2 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접속하도록 상기 제2 결합 방위로 상기 제2 세트의 4개의 전기 콘택트 영역을 편향시키도록 구성된 콘택트 상승 배열부가 또한 제공된다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부는 상기 제1 세트의 4개의 전기 콘택트 영역을 상기 제2 세트의 전기 콘택트 영역으로부터 전기 절연시키는 중앙 절연층을 포함한다.

본 발명의 또 다른 특징에 따라, 상기 중앙 절연층은 복수의 그루브를 포함하고, 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역은 상기 그루브내에 홈을 갖고 있다.

본 발명의 또 다른 특징에 따라, 상기 중앙 절연층은 실질상 강성을 갖고 있다.

본 발명의 또 다른 특징에 따라, 슬리브를 또한 제공되고, 상기 텅 배열부는 상기 슬리브내에 중앙에 배치되어 있고, 상기 텅 배열부는 구부림가능부를 포함하고 있고, 상기 텅 배열부는 상기 텅 배열부 및 상기 스탠더드 커넥터가 결합됨에 따라, (a) 상기 제1 결합 방위로, 오직 상기 제1 세트의 4개의 전기 콘택트 영역만이 상기 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접촉하도록 상기 텅 배열부가 상기 스탠더드 커넥터에 의해 제1 방향으로 이동되고, (b) 상기 제2 결합 방위로, 오직 상기 제2 세트의 4개의 전기 콘택트 영역만이 상기 스탠더드 커넥터의 전기 콘택트의 세트와 기계적 접촉 상태에 있도록 상기 텅 배열부가 상기 스탠더드 커넥터에 의해 제2 방향으로 이동되도록 구성되어 있다.

본 발명의 또 다른 특징에 따라, (a) 상기 제1 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접촉하도록 상기 제1 결합 방위로 상기 제1 세트의 4개의 전기 콘택트 영역을 편향시키고, (b) 상기 제2 세트의 4개의 전기 콘택트 영역이 상기 USB A형 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접촉하도록 상기 제2 결합 방위로 상기 제2 세트의 4개의 전기 콘택트 영역을 편향시키도록 구성된 콘택트 상층 배열부가 또한 제공된다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부는 상기 제1 세트의 4개의 전기 콘택트 영역을 상기 제2 세트의 전기 콘택트 영역으로부터 전기 절연시키는 중앙 절연층을 포함한다.

본 발명의 또 다른 특징에 따라, 상기 중앙 절연층은 복수의 그루브를 포함하고, 상기 제1 세트의 4개의 전기 콘택트 영역 및 상기 제2 세트의 4개의 전기 콘택트 영역은 상기 그루브내에 홈을 갖고 있다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부와 상기 스탠더드 커넥터가 접촉하기 전에 상기 슬리브내에서 상기 텅 배열부를 중앙에 유지시키도록 구성된 센터링 메커니즘을 더 포함한다.

본 발명의 또 다른 특징에 따라, 상기 센터링 메커니즘은 상기 센터링 메커니즘이 상기 스탠더드 커넥터와 초기 접촉할 때 상기 센터링 메커니즘을 해제하여 상기 텅 배열부의 이동을 허용하도록 구성되어 있다.

본 발명의 또 다른 특징에 따라, 상기 센터링 메커니즘은 스프링 리코일드 슬라이딩 로킹 메커니즘을 포함하고 있다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부는 적어도 4개의 금속 스트립을 포함하는 금속 스트립의 세트를 포함하고 있고, 상기 제1 및 제2 세트의 콘택트 영역은 상기 금속 스트립의 영역에 의해 제공되고, 상기 금속 스트립의 세트는 상기 텅 배열부의 주요 구조적 엘리먼트를 형성한다.

본 발명의 또 다른 특징에 따라, 상기 금속 스트립의 세트는 상기 구부림가능부가 상기 텅 배열부의 대부분을 포함하도록 리프 스프링으로서 기능한다.

본 발명의 또 다른 특징에 따라, 상기 금속 스트립의 세트는 적어도 상기 제1 세트의 전기 콘택트 영역을 제공하는 4개의 금속 스트립의 제1 그룹 및 상기 제2 전기 콘택트 영역의 세트를 제공하는 4개의 금속 스트립의 제2 그룹을 포함하고, 상기 금속 스트립의 제1 그룹은 상기 금속 스트립의 제2 그룹으로부터 전기 절연되어 있다.

본 발명의 또 다른 특징에 따라, 4개의 터미널이 위에 배치된 인쇄회로기판 인터페이스 커넥터 배열부가 또한 제공되고, 상기 4개의 터미널의 각각은 인쇄회로기판에 접속하도록 구성되어 있고, 상기 인쇄회로기판 커넥터 배열부는 상기 제1 세트의 전기 콘택트 영역 및 상기 제2 세트의 전기 콘택트 영역의 전기적으로 상응하는 콘택트 영역을 상기 터미널에 전기적으로 접속하기 위한 크로스오버 배열부를 갖고 있다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부의 상기 스탠더드 커넥터와의 결합 방위에 따라 상기 리프 스프링 전기 콘택트 배열부로부터 전기 신호를 투탕하도록 구성된 전자 스위칭 배열부가 또한 제공된다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부는 텅을 갖고 있고, 상기 텅 배열부는 상기 텅에 배치된 절연 캡을 포함하고, 상기 절연 캡은 상기 리프 스프링 전기 콘택트 배열부와 상기 슬리브 사이의 전기 접촉을 방지하도록 구성되어 있다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부가 상기 스탠더드 커넥터의 중공부와 결합됨에 따라 상기 텅 배열부를 상기 스탠더드 커넥터의 콘택트의 세트쪽으로 향하도록 구성되어 있는 텅 기동기가 또한 제공된다.

본 발명의 또 다른 특징에 따라, 상기 텅 배열부는 팁을 갖고 있고, 상기 텅 배열부는 상기 팁에 배치된 절연 캡을 포함하고, 상기 텅 배열부는, (a) 상기 텅 배열부가 상기 증공부와 결합됨에 따라 상기 리프 스프링 전기 콘택트 배열부와 상기 스탠더드 커넥터의 실드 사이의 전기 접촉을 방지하고, (b) 상기 배열부가 상기 증공부와 결합될 때 상기 리프 스프링 전기 콘택트 배열부와 상기 스탠더드 커넥터의 콘택트의 세트 사이를 전기 접촉하도록 구성되어 있다.

본 발명의 또 다른 특징에 따라, (a) 슬리브; 및 (b) 상기 슬리브내에 서로 인접하여 미끄러짐가능하게 장착된 한 쌍의 블록;이 또한 제공되고, 상기 블록은 동작 위치선과 수축 위치선 사이에서 독립적으로 미끄러지도록 구성되어 있고, 상기 블록은 또한, 제1 블록 및 제2 블록을 포함하고, 상기 제1 블록에는 상기 제1 세트의 4개의 전기 콘택트가 위에 배치되어 있고, 상기 제2 블록에는 상기 제2 세트의 4개의 전기 콘택트가 위에 배치되어 있다.

본 발명의 또 다른 특징에 따라, 상기 블록을 상기 동작 위치선으로 복원하도록 구성된 복원 배열부가 또한 제공된다.

본 발명의 또 다른 특징에 따라, 상기 복원 배열부는 2개의 나선형 스프링을 포함하고, 상기 블록은 폭 및 두께를 갖고 있고, 상기 나선형 스프링의 각각은 상기 두께보다 큰 외경을 갖고 있다.

본 발명의 또 다른 특징에 따라, 상기 블록의 각각은 복수의 그루브를 포함하고, 상기 제1 세트의 전기 콘택트 및 상기 제2 세트의 전기 콘택트는 상기 그루브내에 홈을 갖고 있다.

본 발명의 또 다른 특징에 따라, 전기 터미널의 세트가 안에 배치된 하우징이 또한 제공되고, 상기 전기 터미널의 세트 및 상기 제1 세트의 전기 콘택트는, (a) 상기 제1 블록이 상기 동작 위치선에 있을 때 상기 전기 터미널의 세트가 상기 제1 세트의 전기 콘택트와 전기 접촉하고, (b) 상기 제1 블록이 상기 수축 위치선에 있을 때 상기 전기 터미널의 세트가 상기 제1 세트의 전기 콘택트와 전기 절연되도록 구성되어 있다.

본 발명의 또 다른 특징에 따라, (a) 상기 제1 세트의 콘택트 영역이 상기 스탠더드 커넥터의 전기 콘택트의 세트와 기계 접촉하도록 상기 제1 세트의 콘택트 영역이 상기 제1 결합 방향으로 상기 제1 블록으로부터 떨어져 상승하고, (b) 상기 제2 세트의 콘택트 영역이 상기 스탠더드 커넥터의 전기 콘택트의 세트와 기계 접촉하도록 상기 제2 세트의 콘택트 영역이 상기 제2 결합 방향으로 상기 제2 블록으로부터 떨어져 상승하도록 구성된 콘택트 상승 배열부가 또한 제공된다.

본 발명의 또 다른 특징에 따라, 제1 레버 배열부 및 제2 레버 배열부가 또한 제공되고, 상기 제1 레버 배열부는 상기 제1 세트의 콘택트에 기계적으로 접속되어 있고, 상기 제2 레버 배열부는 상기 제2 세트의 콘택트에 기계적으로 접속되어 있고, 상기 제1 레버 배열부 및 상기 제2 레버 배열부는 상기 스탠더드 커넥터에 의한 기동에 응답하여 상기 제1 세트의 콘택트 및 상기 제2 세트의 콘택트를 각각 상승시키도록 구성되어 있다.

본 발명의 또 다른 특징에 따라, 상기 제1 블록은 상기 제1 블록 및 상기 제2 블록의 상대 이동 동안 상기 제1 레버 배열부의 적어도 일부를 수용하도록 구성된 적어도 하나의 그루브를 안에 갖고 있고, 상기 제2 블록은 상기 제1 블록 및 상기 제2 블록의 상대 이동 동안 상기 제2 레버 배열부의 적어도 일부를 수용하도록 구성된 적어도 하나의 그루브를 안에 갖고 있다.

본 발명에 따라, 어플라이언스와 2개의 방위에서 맞물리기 위한 가역 USB 디바이스가 또한 제공되고, 상기 가역 USB 디바이스는, (a) 기능을 수행하도록 구성된 기능 유닛; (b) 잡을 수 있도록(gripping) 구성된 본체; 및 (c) 상기 USB 어플라이언스의 상기 스탠더드 USB A형 리셉터클과 결합하기 위하여 상기 본체로부터 돌출한 가역 USB 플러그를 포함하고, 상기 스탠더드 리셉터클은 고정된 세트의 4개의 전기 콘택트를 갖고 있고, 상기 가역 플러그는 제1 세트의 4개의 전기 콘택트 영역 및 제2 세트의 4개의 전기 콘택트 영역을 포함하고, 상기 제1 및 제2 세트의 4개의 전기 콘택트 영역은, (i) 상기 스탠더드 리셉터클과의 상기 가역 플러그의 제1 결합 방향으로, 상기 제1 세트의 전기 콘택트 영역이 상기 스탠더드 리셉터클의 전기 콘택트의 세트와 기계적으로 접속되어 있고, 상기 제2 세트의 전기 콘택트 영역은 상기 스탠더드 리셉터클의 전기 콘택트의 세트로부터 기계적으로 분리되어 있고, (ii) 상기 스탠더드 리셉터클과의 상기 가역 플러그의 제2 결합 방향으로, 상기 제2 세트의 전기 콘택트 영역이 상기 스탠더드 리셉터클의 전기 콘택트의 세트와 기계적으로 접속되어 있고, 상기 제1 세트의 전기 콘택트 영역은 상기 스탠더드 리셉터클의 전기 콘택트의 세트로부터 기계적으로 분리되어 있다.

실시예

본 발명은 가역 USB 커넥터 구성 및 그 동작의 방법에 관한 것이다.

본 발명에 따른 가역 USB 커넥터의 원리 및 동작은 도면 및 그에 따른 설명을 참조하여 보다 더 잘 이해될 수 있다.

먼저, 본 발명은 스탠더드 A형 USB 커넥터와 접속하기 위한 가역 USB 커넥터를 설명하고 있다. 이 가역 커넥터는 2개의 방위 각각에서 상호교환가능한 스탠더드 커넥터와 맞물리도록 구성되어 있다. 따라서, 이 가역 커넥터는 제1 방위로 스탠더드 커넥터와 결합할 수 있고, 이 커넥터들은 분리될 수 있고, 이 커넥터중 하나는 180도 회전될 수 있고 그다음 커넥터들은 가역 커넥터를 재구성하거나 조정할 필요없이 다시 결합할 수 있다. 용어 "커넥터"는 여기에서 플러그 및 리셉터를 모두 포함하도록 정의되어 있다. A형 USB 스탠더드 커넥터는 여기에서 그것을 가역으로 만드는 임의의 수정 없이 USB 스탠더드와 합치하는 커넥터로서 정의되어 있다. 이러한 스탠더드는 당업분야에서 잘 정의되어 있고, 유니버설 시리얼 버스 구현 포럼(USB-IF)에 의해 표준화되어 있다. 본 발명은 또한 가역 USB 디바이스를 설명하고 있다. 구 "USB 디바이스"는 여기에서 USB 플러그와 함께 일체로 형성되거나 그에 부착되는 본체를 포함하고, 기능을 실행하도록 구성되거나 프로그램화되는 임의의 디바이스를 포함하는 것으로 정의되어 있다. 본 발명의 가역 USB 디바이스는 가역 USB 플러그를 포함하여 사용자가 가역 디바이스의 본체를 잡고 이것을 2개의 방위중 어느 하나로 스탠더드 USB 리셉터를 결합시킬 수 있다. 마지막으로, 본 발명은 가역 USB 어플라이언스를 설명하고 있다. 구 "USB 어플라이언스"는 여기에서 USB 리셉터와 일체로 형성되거나 부착된 본체를 포함하고, 기능을 실행하도록 구성되거나 프로그램화되어 있는 임의의 디바이스를 포함하도록 정의되어 있다. 본 발명의 가역 USB 어플라이언스는 가역 USB 리셉터(소켓)를 포함하여 사용자가 스탠더드 USB 디바이스를 잡고 이것을 2개의 방위중 하나로 상기 어플라이언스의 가역 USB 리셉터와 결합시킬 수 있다.

도면에 도시된 본 발명의 구체적인 구현예로 가기 전에, 아래에 기술된 구현예의 모두에 공통인 본 발명의 개념을 기술하는 것이 도움이 될 것이다. 따라서, 일반적으로, 본 발명은 USB A형 스탠더드 커넥터(리셉터 또는 플러그)와 결합하기 위한 가역 커넥터(플러그 또는 리셉터)를 제공하고, 이 스탠더드 커넥터는 중공부, 이 중공부의 일측상에 배치된 4개의 전기 콘택트의 고정 세트 및 상기 중공부의 3개의 측에 배치된 도전성의 실드를 갖고 있다. 본 발명의 가역 커넥터는 제1 세트의 4개의 전기 콘택트 영역 및 제3 세트의 4개의 전기 콘택트 영역을 포함하고 있다. 제1 및 제2 세트의 전기 콘택트 영역은 스탠더드 커넥터와의 가역 커넥터의 제1 결합 방위로, 제1 세트의 전기 콘택트 영역이 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접촉되고 제2 세트는 스탠더드 커넥터의 전기 콘택트의 세트로부터 기계적으로 분리되도록 구성되어 있다. 상기 콘택트의 세트는 스탠더드 커넥터와의 가역 커넥터의 대안의 제2 결합 방위로, 상기 제2 세트의 전기 콘택트 영역이 스탠더드 커넥터의 전기 콘택트의 세트와 기계적으로 접촉되고 제1 세트는 스탠더드 커넥터의 전기 콘택트의 세트로부터 기계적으로 분리된다.

본 발명의 기초가 되는 가역 커넥터 개념을 구현하기 위한 많은 가능한 기계 솔루션이 존재하고, 이 모두는 본 발명의 일반적인 범위내에 있다. 본 발명은 작은 수의 특정 바람직한 예에 대하여 아래에 예시되지만, 이에 제한되지는 않는다. 이러한 예중 일부에서, 2개의 세트의 콘택트는 단일 인터페이스 엘리먼트의 양측상에 배치되어 콘택트의 한 세트는 인터페이스 엘리먼트의 방위에 관계없이 정확하게 방위지정된다. 이 인터페이스 엘리먼트는 강성 블록일 수 있거나 이동가능하거나 가요성의 텅일 수 있다. 아래에 설명되는 다른 구현예에서, 콘택트의 각 세트는 별개의 블록상에 배치되고 블록들은 적절하게 방위지정된 블록이 요구된 접속을 이루도록 선택적으로 수축가능하다. 이러한 옵션은 아래에 상세하게 설명될 것이다.

각각의 구현을 위해, USB 디바이스 또는 어플라이언스의 연관된 전자장치와의 각 세트의 콘택트의 정확한 접속은 당업자에게 명백한 많은 방법으로 달성될 수 있다. 다음과 같은 3가지 특정 바람직한 접속 옵션 예에 대해 설명할 것이지만 이에 제한되는 것은 아니다. 첫번째 옵션은 전자 스위칭 배열은 2개의 세트의 콘택트 사이의 접속 사이를 자동 전환하기 위해 사용되고, 대안으로, 전기 콘택트의 크로스오버 배열이 PCB에 양 세트의 콘택트를 병렬로 접속하기 위해 사용되고, 마지막으로, 추가 옵션은 8개의 별개의 입력 콘택트를 가진 수정된 PCB를 채용하고, 요구된 접속은 스위칭과 함께 또는 없이 일체로 달성될 수 있다. 이러한 옵션은 아래에 설명될 것이다. 그러나, 상이한 옵션이 설명된 다양한 실시예 사이에서 상호교환가능하다는 것에 주목해야 한다.

가역 커넥터의 10개의 실시예가 아래에 설명될 것이다. 도 1a 내지 도 4g를 참조하여 설명된 처음 5개의 실시예는 A형 USB 스탠더드 리셉터에 접속하기 위한 가역 플러그를 설명한다. 도 5a 내지 도 8g를 참조하여 설명된, 마지막 5개의 실시예는 A형 USB 스탠더드 플러그로의 접속을 위한 가역 리셉터를 설명한다. 도 1a 내지 도 4g의 상기 플러그에 일반적인, 가역 USB 디바이스의 전체 최종 기능이 도 9a 내지 도 9b를 참조하여 설명되어 있다. 마지막으로, 도 5a 내지 도 8g의 리셉터 실시예에 일반적인 USB 가역 리셉터를 포함하는 어플라이언스는 도 10을 참조하여 설명되어 있다.

본 설명 및 첨부된 청구범위가 A형 USB 스탠더드 커넥터로의 접속을 위한 가역 커넥터를 구체적으로 언급하고 있지만, 이러한 용어는 2개의 디바이스를 접속하기 위한, 상이한 스탠더드를 갖지만 유사한 설계사항을 갖고 있는, 다른 기존의 또는 미래의 커넥터를 포함하도록 해석되어야 한다.

이제 도 1a-d에 대해 설명된다. 도 1a는 본 발명의 바람직한 실시예에 따라 구성되고 동작가능한 가역 플러그(10)의 등각 사시도이다. 도 1b는 도 1a의 가역 플러그(10)의 평면도이다. 도 1c는 도 1b의 라인 C-C에 대한 단면도이다. 도 1d는 도 1a의 가역 플러그(10)의 분해 등각사시도이다. 가역 플러그(10)는 슬리브(14), 텅 배열부(16) 및 센터링 메커니즘(18)을 갖고 있다. 상세한 설명 및 청구범위에서 사용된 구 "텅 배열부"는 일반적으로 플랫 배열부를 말하고 (즉, 제3 "두께" 치수보다 상당히 큰 2개의 치수 "길이" 및 "폭"을 갖고 있다) 이것은 그 두께 치수에 대해 대략 평행한 방향으로, 즉, 그 두 개의 보다 큰 치수에 대략 수직인 방향으로, 적어도 특정 조건하에서 이동가능하다. 언급된 치수는 자체가 도 2a-2f, 2h-2m, 6a-6i에서 아래에서 설명되는 내부 공간을 가진 개방 구조 또는, 여기에 도 1a-1d 그리고 아래의 도 5a-5e에서 설명되어 있는 솔리드 구조일 수 있는 배열부의 외부 치수이다. 텅 배열부 또는 그 파트의 이동은 대략 평행 모션일 수 있거나 효과적인 피벗 축에 대한 피벗 이동 또는 자체 텅 배열의 가요성을 통해 달성되는 가요성 모션일 수 있다.

슬리브(14)는 USB 리셉터클의 스탠더드 실딩 구성과 결합하도록 구성된 전기 도전성 실드이고, 따라서 4개의 일반적으로 직방형인 사이드를 갖는다. 텅 배열부(16)는 슬리브(14)내에 일체로 중앙에 배치되어 있다. 텅 배열부(16)는 중심 절연층(20)을 포함하고 있다. 중심 절연층(20)은 상부 메이저사이드(22) 및 하부 메이저사이드(24)를 갖고 있다. 가역 플러그(10)가 가역성을 갖고 있기 때문에 상부 메이저사이드(22)는 하부 메이저사이드가 될 수 있고, 하부 메이저사이드(24)는 상부 메이저사이드가 될 수 있다는 것에 주목해야 한다. 그럼에도 불구하고, "상부" 및 "하부"의 제한되지 않는 용어가 도면을 참조하여 본 발명을 설명하기 위해 명확한 설명을 위해 채택되었다. 상부 메이저사이드(22)는 그 안에 4개의 그루브(26)를 갖고 있다. 이와 마찬가지로, 하부 메이저사이드(24)는 그 안에 4개의 그루브(도시되지 않음)를 갖고 있다. 가역 플러그(10)는 상부 메이저사이드(22)의 그루브(26)내에 홈이 파진 전기 콘택트 영역(28)의 상부 세트와 포함하고 있다. 이와 마찬가지로, 가역 플러그(10)는 하부 메이저사이드(24)의 그루브내에 홈이 파진 전기 콘택트 영역(30)의 하부 세트를 포함한다. 전기 콘택트 영역(28)은 중앙 절연층(20)에 의해 전기 콘택트 영역(30)으로부터 전기적으로 절연되어 있다. 텅 배열부(16)는 구부림가능부(32)를 포함하고 있다. 구부림가능부(32)는 도 1e 및 도 1f를 참조하여 아래에 설명되어 있는 바와같이 USB 리셉터클과 결합될 때 텅 배열부(16)가 상하로 이동하도록 한다. 구부림가능부(32)는 보통 가요성 엘리먼트이다. 그러나, 당업자는 구부림가능부(32)가 또한 힌지 또는 이와 유사한 부재일 수 있음을 이해할 것이다.

텅 배열부(16)는 USB 리셉터클과 결합되지 않을 때 탄성적으로 자체 센터링하도록 형성되는 것이 바람직하다. 그럼에도 불구하고, 텅 배열부(16)가 항상 USB 리셉터클내에 삽입되기 전에 슬리브(14)내에 항상 센터링되기 위하여 가역 플러그(10)는 또한 슬리브(14)내에 텅 배열부(16)를 중앙에 유지하도록 구성된 센터링 메커니즘(18)을 포함하는 것이 바람직하다. 센터링 메커니즘(18)은 도 1e 및 도 1f를 참조하여 보다 상세하게 설명될 것이다.

도 1e 및 도 1f에 대해 설명한다. 도 1e는 (명확히 하기 위해 그 외부 하우징이 제거된) A형 USB 스탠더드 리셉터클(34)과 접촉하는 (명확히 하기 위해 슬리브(14)가 제거된) 도 1a의 가역 플러그(10)의 등각사시도이다. 도 1f는 도 1e의 가역 플러그(10) 및 A형 USB 스탠더드 리셉터클(34)의 대략 반투명 측면도이다. A형 USB 스탠더드 리셉터클(34)은 3개의 사이드상에서 중공부(48)를 둘러싸는 실드(52; 도 1f)를 갖고 있다. 4개의 전기 콘택트(50)의 세트가 중공부(48)의 일 사이드상에 절연 블록(54)상에 배치되어 있다. 전기 콘택트(50)는 아래에 설명되는 바와 같이, 가역 플러그(10)의 전기 콘택트 영역(28) 또는 전기 콘택트 영역(30) 어느 하나와 전기적으로 접촉하는 돌출부(51)를 갖고 있다. 전기 도전 실드인 실드(52)는 중공부(48)의 또 다른 3개의 측상에 배치되어 있다. 실드(52)는 4개의 측을 갖고 있어 중공부(48) 및 절연블록(54)이 실드(52)에 의해 둘러싸여 있다. 절연 블록(54)과 실드(52) 사이에 갭이 있어 가역 플러그(10)의 슬리브(14)는 가역 플러그(10)가 A형 USB 스탠더드 리셉터클(34)과 결합될 때 이러한 갭 사이에 삽입된다. 절연 블록(54)는 A형 USB 스탠더드 리셉터클(34)로의 입구에서 곡면을 갖는 상부 예지(56)를 갖고 있다.

센터링 메커니즘(18)은 2개의 긴 사이드 패널(36)을 포함하고 있다. 각 패널(36)은 일단부에서 안에 V형상의 노치(38)를 갖는다. 각 패널(36)의 또 다른 단부는 저속 부재(40)에 접속되어 있다. 패널(36)은 저속 부재(40)에 접속되어 있어서, 패널(36)은 서로 평행하고 패널(36) 사이의 공간은 텅 배열부(16)를 수용한다. 센터링 메커니즘(18)은 보통 유일하게 성형된 플라스틱 엘리먼트로서 형성되어 있다. 텅 배열부(16)는 립(42)을 갖고 있다. 립(42)은 센터링 메커니즘(18)의 V형상의 노치(38)와 맞물리기 위한 립(42)의 어느 한 사이드상에 배치되어 있는 돌출부(44)를 포함하고 있다. 센터링 메커니즘(18)은 수축가능하고 도 1e에 도시된 바와 같이 전방향 포지션으로 확장 스프링(46)에 의해 보통 바이어싱되고, 이 도 1e에서 V형 노치(38)와의 돌출부(44)의 맞물림은 텅 배열부(16)의 상하 이동 및 센터를 방지한다. 따라서, 센터링 메커니즘(18)은 스프링 리코일드 슬라이딩 잠금 메커니즘이다. 이러한 방식으로, 가역 플러그(10)가 A형 USB 스탠더드 리셉터클(34)에 접속되지 않을 때, 텅 배열부(16)는 센터링 메커니즘(18)에 의해 센터링되어 있다.

A형 USB 스탠더드 리셉터클(34)의 절연 블록(54)과 센터링 메커니즘(18)의 패널(36)의 초기 접촉은 패널(36)을 후방으로 밀어낸다. 이러한 액션은 센터링 메커니즘(18)의 V형 노치(38)로부터 텅 배열부(16)의 돌출부(44)를 해제하고, 그래서 텅 배열부(16)의 상하 이동을 허용한다.

가역 플러그(10)가 A형 USB 스탠더드 리셉터클(34)내로 삽입될 때, 텀(42)는 절연 블록(54)의 곡면을 가진 상부 예지(56)와 접촉한다. 곡면 상부 예지(56)는 텀(42)을 밀어내고 따라서 텀 배열부(16)를 위로 밀어낸다. 가역 플러그(10)는 중공부(48)내에 완전히 삽입된다. 이 때, 텀 배열부(16)의 하부 메이지 사이드(24)의 전기 콘택트 영역(30)만이 A형 USB 스탠더드 리셉터클(34)의 전기 콘택트(50)와 기계적으로 접촉한다. 용어 "전기 콘택트 영역(30)만"은 여기에 전기 콘택트 영역(28)을 제외하도록 정의되어 있다. 상부 메이지 사이드(22)의 전기 콘택트 영역(28)은 중앙 절연층(20)내에 홈을 갖고 있고, 전기 콘택트 영역(28)은 슬리브(14)로부터 전기적으로 절연되어 있다. 이것은 슬리브(14)와의 전기 콘택트 영역(28)의 단락을 방지하기 위해 중요하다. 상기 단락은 A형 USB 스탠더드 리셉터클(34)과의 가역 플러그(10)의 하나의 결합 방식을 설명하고 있다.

제2 결합 방식이 아래에 설명되어 있다. 이러한 결합 방식을 설명하기 위해, A형 USB 스탠더드 리셉터클(34)의 180도 회전을 고려하는 것이 보다 편리하고 절연 블록(54)은 가역 플러그를 회전시키기 보다는 중공부(48) 위에 있다. 가역 플러그(10)가 A형 USB 스탠더드 리셉터클(34)내에 삽입됨에 따라, 텀 배열부(16)가 아래로 이동된다. 가역 플러그(10)가 완전히 삽입될 때, 텀 배열부(16)의 상부 메이지 사이드(22)의 전기 콘택트 영역(28)만이 A형 USB 스탠더드 리셉터클(34)의 전기 콘택트(50)와 기계적으로 접촉한다. 용어 "전기 콘택트 영역(28)만"은 전기 콘택트 영역(30)을 제외하는 것으로 여기에 정의되어 있다. 마찬가지로, 이러한 제2 결합 방식에서, 하부 메이지 사이드(24)의 전기 콘택트 영역(30)이 슬리브(14)로부터 전기적으로 절연되어 있다. 이러한 실시예는 당업자에게 잘 알려진 바와 같이, 적합하게 채택된 인쇄 회로 기판에 직접 접속될 수 있는 8개의 외부 커넥터를 도시한다. 앞서 설명된 바와 같이, 이러한 접속 솔루션은 아래에 설명되는 전기 스위칭 및 크로스오버 접속의 대안의 솔루션과 상호교환가능하다.

이제 도 2a-c에 대해 설명한다. 도 2a는 본 발명의 제1 대안의 실시예에 따라 구성되고 동작가능한 가역 플러그(58)의 등각사시도이다. 도 2b는 도 2a의 가역 플러그(58)의 경면도이다. 도 2c는 도 2b의 라인 C-C에 대한 단면도이다. 가역 플러그(58)는 도 2a 내지 도 2f에 도시되고 아래에 설명된 차이를 제외하고 가역 플러그(10)와 실질상 동일하다. 가역 플러그(58)는 제1 세트의 4개의 전기 콘택트 영역(60) 및 제2 세트의 4개의 전기 콘택트 영역(62)으로부터 형성된 텀 배열부(66)를 가지고 있다. 텀 배열부(66)는 전기 콘택트 영역(60,62) 자체를 제공하는 금속 스트립이 텀 배열부의 주요 구조적 엘리먼트를 구성한다는 점에서 도 1a-1f의 것과 특별히 구별된다. 용어 "주요 구조적 엘리먼트"는 그것이 없으면 자체 지지되지 않는 엘리먼트 또는 엘리먼트의 세트를 언급하는 것으로 여기에 사용되어 있다. 최종 구조는 리프 스프링 전기 콘택트 배열부(64)인 것이 효율적이다. 즉, 텀 배열부의 주요 구조는 그 길이 대부분 또는 모두를 따라 탄성적인 가요성을 갖고 있어서 텀 배열부의 요구되는 상하 플렉싱은 이전의 실시예와 같이 국부적인 가요성 영역을 없이 전체 구조를 플렉싱함으로써 발생된다. 텀 배열부(66)는 처음에 전기도전성 슬리브(72)내에 중앙에 배치되어 있고 탄성적으로 그 중앙 포지션으로 복귀하는 것이 바람직하다. 전기 콘택트 영역(60) 및 전기 콘택트 영역(62)은 리프 스프링 전기 콘택트 배열부(64)를 형성하도록 구부러지는 4개의 금속 스트립으로부터 보통 구성된다. 그러나, 리프 스프링 전기 콘택트 배열부(64)는 8개 이상의 금속 스트립으로부터 형성될 수 있고, 그다음 이것들은 리프 스프링 전기 콘택트를 형성하기 위해 함께 결합된다는 것을 당업자는 이해할 것이다. 이러한 실시예에서는 아무런 중앙 절연층이 존재하지 않는다. 개별적인 리프 스프링 전기 콘택트가 이들의 텀에서 절연된 캡(68)을 통해 접속되어 있다.

이제 A형 USB 스탠더드 리셉터클(34)과 접촉하는 도 2a의 가역 플러그(58)의 단면도인 도 2d에 대해 설명한다. 대신에 캡(68)은 A형 USB 스탠더드 리셉터클(34)의 절연 블록(54)의 곡면을 갖는 상부 예지(56)를 통해 A형 USB 스탠더드 리셉터클(34)내로 삽입될 때 (A형 USB 스탠더드 리셉터클(34) 및 가역 플러그(58)의 결합 방식에 따라) 상하로 텀 배열부(66)가 밀어지도록 뺄축한 단부를 갖고 있다. 도 2d의 예에서, 텀 배열부(66)는 A형 USB 스탠더드 리셉터클(34)의 중공부(48)내로 삽입될 때 뒷방향으로 밀려질 것이다.

이제 완전히 결합된 가역 플러그(58) 및 A형 USB 스탠더드 리셉터클(34)의 단면도인 도 2e에 대해 설명한다. 절연된 캡(68)이 A형 USB 스탠더드 리셉터클(34)와의 가역 플러그(58)의 양 결합 방식으로 리프 스프링 전기 콘택트 배열부(64)와 슬리브(72) 사이의 전기 접속을 방지하기 위하여 구성되어 있다. 또한, 절연된 캡(68) 및 리프 스프링 전기 콘택트 배열부(64)는 리프 스프링 전기 콘택트 배열부(64)가 가역 플러그(58)의 양 결합 방식으로 A형 USB 스탠더드 리셉터클(34)의 전기 콘택트(50)의 돌출부(51)와 전기적으로 접촉하도록 구성되어 있다. 따라서, 리프 스프링 전기 콘택트 배열부(64)의 각 콘택트는 텀 배열부(66)의 텀에서 다이아몬드 형상을 형성한다. 텀 배열부(66)의 텀에 가장 가까운 다이아몬드 형상의 절반부는 절연된 캡(68)에 의해 덮여있다. 다이아몬드 형상의 또 다른 절반부는 다이아몬드의 이러한 부분이 전기 콘택트(50)의 돌출부(51)와 전기 접촉하도록 절연되어 있지 않다. 다이아몬드 형상은 돌출부(51)와 최대 접촉하도록 구성되어 있다.

이제 (명확히 하기 위해 그 외부 하우징이 제거된) 완전히 결합된 도 2e의 가역 플러그(58) 및 A형 USB 스탠더드 리셉터클(34)의 등각사시도인 도 2f에 대해 설명한다. 전기 콘택트 영역(60)의 각각이 상응하는 전기 콘택트 영역(62)과 전기 접

속되어 있기 때문에, 리프 스프링 전기 콘택트 배열부(64)로부터의 전기 신호는 가역 플러그의 A형 USB 스탠더드 리셉터클(34)와의 결합 방위에 따라 루팅될 필요가 있다. 따라서, 가역 플러그(58)는 텅 배열부(66)의 A형 USB 스탠더드 리셉터클(34)와의 결합 방위에 따라 리프 스프링 전기 콘택트 배열부(64)로부터의 전기 신호를 루팅하도록 구성된 전자 콘택트 배열부(64)를 포함하고 있다. 전자 스위칭 배열부(70)의 기능을 실행하기 위한 적합 디바이스를 설계하고 생성하는 방법이 당업자에 의해 이해될 것이다. 전자 스위칭 배열부(70)의 바람직한 실시예는 아래에 설명되어 있다.

이제 도 2a의 플러그(58)와 함께 사용되기 위한 전자 스위칭 배열부(70)의 개략도인 도 2g에 대해 설명한다. 가역 플러그(58)는 2개의 파워 핀 및 2개의 데이터 핀을 갖고 있다. 전자 스위칭 배열부(70)는 전력 검출 회로(61), 전력 반전 배열부(63) 및 데이터 반전 배열부(65)를 포함하고 있다. 가역 플러그(58)의 파워 핀 출력부중 하나는 전력 검출 회로(61)에 입력된다. 전력 검출 회로(61)은 가역 플러그(58)의 어느 하나의 출력 핀에 전기 접속될 수 있다. 전력 검출 회로(61)의 출력은 데이터 반전 배열부(65)에 공급된다. 또한, 가역 플러그(58)의 데이터 핀의 출력은 데이터 반전 배열부(65)에 공급된다. 데이터 반전 배열부(65)는 전력 검출 회로(61)의 출력에 따라 데이터 핀의 출력을 루팅하도록 구성되어 있어, 필요하다면 출력을 반전시킨다. 데이터 반전 배열부(65)는 예를 들어, USB 2.0과 호환하는 아날로그 스위치이지만 ADG 3257에 제한되는 것은 아니다. 전력 반전 배열부(63)는 필요하다면 전력 출력을 반전시킨다. 전력 반전 배열부(63)는 보통 달링턴 브리지 다이오드 회로이다.

이제 도 2h 내지 도 2k에 대해 설명한다. 도 2h는 A형 USB 스탠더드 리셉터클(34)과 접촉하는, 본 발명의 제2 대안 실시예에 따라 구성되고 동작가능한 가역 플러그(240)의 단면도이다. 도 2i는 완전히 결합된 도 2h의 가역 플러그(240) 및 A형 USB 스탠더드 리셉터클(34)의 단면도이다. 도 2j는 (명확히 하기 위해 그 외부 하우징이 제거된) 완전히 결합된 가역 플러그(240) 및 A형 USB 스탠더드 리셉터클(242)의 등각사시도이다. 도 2k는 도 2h의 가역 플러그(240)의 텅 배열부(252)의 상면도이다. 도 2m은 도 2k의 텅 배열부(252)의 등각사시도이다. 가역 플러그(240)는 도 2h 내지 도 2m에 도시되고 아래에 설명된 차이 외에는 도 2a 내지 도 2g의 가역 플러그(58)와 실질상 동일하다. 가역 플러그(240)는 전기 콘택트 영역(246)의 세트와 전기 콘택트 영역(248) 사이에 배치된 절연층(244)을 갖는 텅 배열부(252)를 포함하고 있다. 전기 콘택트 영역(246)의 세트 및 전기 콘택트 영역(248)의 세트는 리프 스프링 전기 콘택트 배열부(250)로서 형성되어 있다. 전기 콘택트 영역(246)의 세트 및 전기 콘택트 영역(248)의 세트는 텅 배열부(252)의 틸에서 전기적으로 접속되어 있지 않다. 가역 플러그(58)에서와 같이, 가역 플러그(240)의 텅 배열부(252)의 주요 구조적 엘리먼트는 역시 리프 스프링 전기 콘택트 배열부(250)로서 기능하는 금속 스트립의 세트이다. 절연층(244)은 주로 텅 배열부(252)의 가요부상에서 전기 콘택트 영역(246)의 세트 및 전기 콘택트 영역(248)의 세트를 전기적 이격시키기 위한 것이다. 또한 가역 플러그(240)는 위에 4세의 터미널(258)이 배치된 인쇄 회로 기판 인터페이스 커넥터 배열부(256)를 포함하고 있다. 각 터미널(258)은 인쇄 회로 기판(260)에 접속하도록 구성되어 있다. 인쇄 회로 기판 인터페이스 커넥터 배열부(256)는 전기 콘택트 영역(246)의 세트 및 전기 콘택트 영역(248)의 세트의 상응하는 접촉 영역을 터미널(258)에 전기 접속하기 위한 크로스오버 배열부(262)를 갖고 있다. 용어 "전기적으로 상응하는 접촉 영역"은 A형 USB 스탠더드 리셉터클(242)의 동일한 전기 접촉과 동일한 전기 접촉을 이루는 가역 플러그(240)의 접촉 영역으로부터 여기에 정의되어 있다. 따라서, 어느 결합 방위에서든 가역 플러그(240)는 A형 USB 스탠더드 리셉터클(242)내로 삽입되고, A형 USB 스탠더드 리셉터클(242)의 동일한 터미널이 인쇄 회로 기판 인터페이스 커넥터 배열부(256)의 동일한 터미널(258)과 전기적으로 접촉상태에 있게 된다. 따라서, 전자 스위칭 배열부(70)는 이러한 실시예에서 필요하지 않다. 터미널(258)의 배열은 인쇄 회로 기판에 접속하기 위해 스탠더드 USB 핀 뱅크와 상이하다는 것에 주목해야 한다. 도 2h 내지 도 2m에 도시된 배열은 도면을 단순히 하기 위해 선택되었다. 그러나, 터미널(258)이 인쇄 회로 기판에 접속하기 위해 스탠더드 USB 핀 배열에 따라 배열될 수 있다는 것을 당업자는 이해할 것이다.

이제 도 3a-d에 대해 설명한다. 도 3a는 본 발명의 제3 대안의 실시예에 따라 구성되고 동작가능한 가역 플러그(74)의 등각사시도이다. 도 3b는 도 3a의 가역 플러그(74)의 평면도이다. 도 3c는 도 3b의 라인 C-C에 대한 단면도이다. 도 3d는 도 3b의 라인 D-D에 대한 단면도이다. 가역 플러그(74)는 제1 3개의 실시예의 텅 배열부와 유사한 인터페이스 엘리먼트(73)를 포함하고 있다. 제1 3개의 실시예와 달리, 가역 플러그(74)는 이러한 경우에 인터페이스 엘리먼트(73)를 둘러싸는 슬리브 또는 실드를 가지고 있지 않다. 외부 슬리브의 부재의 결과로서, 인터페이스 엘리먼트(73)는 그것이 부착되어 있는 디바이스에 대한 상하 이동의 자유없이 견고하게 장착될 수 있다. 대신에, 인터페이스 엘리먼트는 삽입동안 전체 디바이스와 함께 소켓내에 자체 센터링한다. 여기에 설명되는 바와 같이 인터페이스 엘리먼트(73)는 상부 메이저 표면(76) 및 하부 메이저 표면(78)을 갖는 중앙 절연층(75)을 포함하고 있다. 중앙 절연층(75)은 실질상 강성을 갖는다. 여기에서 사용되는 용어 "실질상 강성"이라는 말은 중앙 절연층의 메이저 주교 엘리먼트가 상대적으로 강성을 갖는다는 것을 의미한다. 그러나, 상기 엘리먼트는 중앙 절연층(75)상에 배치된 돌출부 및 마이너 표면 특징을 포함하는 추가로 포함하고, 그중 일부는 아래에 설명되는 바와 같이 가요성을 가질 수 있다는 것에 주목해야 한다. 상부 메이저 표면(76)은 4개의 전기 콘택트(80)의 세트가 홈이 파진 4개의 그루브를 포함하고 있다. 하부 메이저 표면(78)은 4개의 전기 콘택트(82)의 세트가 홈이 파진 4개의 그루브를 포함하고 있다.

가역 플러그(74)는 중앙 절연층(75)의 어느 한 사이드상에 배치된 돌출부(84)를 포함하고 있다. 또한, 가역 플러그(74)는 상부 페이지 표면(76) 및 하부 페이지 표면(78)상에 배치된 2개의 돌출부(86)를 포함하고 있다. 돌출부(84,86)는 A형 USB 스탠더드 리셉터클(34)의 중공부(48)내에 인터페이스 엘리먼트(73)의 금아향 이동을 감소시키는 것은 물론 A형 USB 스탠더드 리셉터클(34)의 중공부(48)내에 인터페이스 엘리먼트(73)를 센터링하도록 구성되어 있다. 돌출부(84,86)는 중앙 절연층(75)과 일체로 형성된 가요성 돌출부인 것이 보통이다. 돌출부(86)는 또한, 도 3f에 대하여 아래에 설명되는 바와 같이, 전기 콘택트(80)와 전기 콘택트(82)가 A형 USB 스탠더드 리셉터클(34)의 실드(52)와 전기 접촉하지 않도록 방지한다.

이제 도 3e 및 도 3f에 대해 설명한다. 도 3e는 A형 USB 스탠더드 리셉터클(34)내로 삽입되는 도 3a의 가역 플러그(74)의 평면도이다. 도 3f는 도 3e의 라인 F-F에 대한 단면도이다. 도 3e 및 도 3f의 예에서, 가역 플러그(74)는 제1 결합 방식으로 A형 USB 스탠더드 리셉터클(34)내에 삽입된다. 이러한 결합 방식에서, 상부 페이지 표면(76)의 전기 콘택트(80)는 A형 USB 스탠더드 리셉터클(34)의 전기 콘택트(50)와 전기 접촉상태에 있게 된다. 돌출부(86)는 하부 페이지 표면(78)의 전기 콘택트(82)가 A형 USB 스탠더드 리셉터클(34)의 실드(52)와 전기 접촉 상태가 되는 것을 방지한다.

이와 마찬가지로, 가역 플러그(74) 또는 A형 USB 스탠더드 리셉터클(34)중 어느 하나가 뒤집어진다면, 하부 페이지 표면(78)의 전기 콘택트(82)는 가역 플러그(74)가 제2 결합 방식으로 A형 USB 스탠더드 리셉터클(34)와 결합할 때 A형 USB 스탠더드 리셉터클(34)의 전기 콘택트(50)와 접촉하게 된다. 이와 마찬가지로, 이러한 제2 결합 방식에서, 돌출부(86)는 전기 콘택트(80)이 실드(52)와 전기 접촉되는 것을 방지한다.

이제 4a-e에 대해 설명한다. 도 4a는 본 발명의 제4 대안의 실시예에 따라 구성되고 동작가능한 가역 플러그(90)의 등각 사시도이다. 도 4b는 도 4a의 가역 플러그(90)의 평면도이다. 도 4c는 도 4b의 라인 C-C에 대한 단면도이다. 도 4d는 도 4c의 라인 D-D에 대한 단면도이다. 도 4e는 도 4a의 가역 플러그(90)의 분해도이다. 가역 플러그(90)는 슬리브(92) 및 이 슬리브(92)내에서 서로 인접하여 미끄럼가능하게 장착된 한 쌍의 블록(94)을 포함하고 있다. 블록(94)은 도 4e 및 도 4f에 대하여 보다 상세하게 설명되는 바와 같이 동작 포지션과 수축 포지션 사이에 독립적으로 미끄러지도록 구성되어 있다. 용어 "독립적으로 미끄럼짐"은 다른 블록의 포지션과 독립적으로 동작 포지션과 수축 포지션 사이에 각각의 블록이 미끄러지는 것으로 여기에 정의되어 있다. 슬리브(92)는 슬리브(92)의 후방에서 하나, 그리고 A형 USB 스탠더드 리셉터클(34)과 결합하는 슬리브(92)의 단부에서 하나, 이렇게 2개의 개방 단부를 갖고 있다. A형 USB 스탠더드 리셉터클(34)과 결합하는 슬리브(92)의 개방 단부는 개방 단부(96)를 결합하는 것으로 되어 있다. 동작 포지션은 블록(94)이 슬리브(92)의 결합 개방 단부(96)와 수평을 이루는 곳이다. 수축 포지션은 블록(94)이 가역 플러그(90)의 구속으로 인해 이동되는 만큼 슬리브(92)내로 밀려지는 곳이다. 블록(94)은 상부 블록(98) 및 하부 블록(100)을 포함하고 있다. 4개의 전기 콘택트(102)의 세트는 상부 블록(98)의 하부 표면(104)내의 4개의 그루브내로 홈을 갖고 있다. 이와 마찬가지로, 4개의 전기 콘택트(106)의 세트는 하부 블록(100)의 상부 표면(108)내의 4개의 그루브내에 홈을 갖고 있다. 따라서, 전기 콘택트(102)는 상부 블록(98) 및 하부 블록(100) 모두가 동작 포지션에 있을 때 전기 콘택트(106)와 마주한다. 각 블록(94)은 4개의 채널(132)을 안에 포함하고 있다. 전기 콘택트(102) 및 전기 콘택트(106)는 하부 표면(104) 및 상부 표면(108)으로부터 각각, 채널(132)을 통해 상부 블록(98)과 하부 블록(100)의 또 다른 사이드로 각각 계속되어 있다. 따라서, 하부 블록(100)의 상부 블록(98)상의 상부 표면(134)과 하부 블록(100)의 하부 표면(136)상의 전기 콘택트(102) 및 전기 콘택트(106)의 외부 콘택트 영역(138)이 각각 존재한다. 외부 콘택트 영역(138)의 기능이 아래에 보다 상세히 설명되어 있다. 블록(94)은 보통 하나 이상의 성형된 플라스틱 섹션으로부터 형성되어 있다.

가역 플러그(90)는 또한 슬리브(92)의 후방부 둘레에 배치된 후방 하우징(116)을 포함하고 있다. 후방 하우징(116)은 상부 직방형 플레이트(118), 하부 직방형 플레이트(120) 및 중앙 직방형 플레이트(122)를 갖고 있다. 상부 직방형 플레이트(118)의 하나의 단부는 중앙 직방형 플레이트(122)에 접속되어 있다. 이와 마찬가지로 하부 직방형 플레이트(120)의 하나의 단부는 중앙 직방형 플레이트(122)에 접속되어 있다. 후방 하우징(116)은 보통 고유의 성형된 플라스틱 또는 엘리먼트로서 형성되어 있다. 상부 직방형 플레이트(118)의 상부 표면은 안에 복수의 전기 터미널(126)에 홈을 형성하기 위한 복수의 그루브(124)를 안에 갖고 있다. 이와 마찬가지로, 하부 직방형 플레이트(120)의 표면의 바닥부는 안에 복수의 전기 터미널(130)에 홈을 형성하기 위한 복수의 그루브(128)를 안에 갖고 있다. 각 그루브(124)는 슬리브(92)의 결합 개방 단부(96)에 가장 가까운 단부에서 종료하고, 개구(142)는 상부 직방형 플레이트(118)의 표면에 형성되어 있다. 전기 터미널(126)은 상부 블록(98)이 동작 포지션에 있을 때 전기 콘택트(102)의 외부 콘택트 영역(138)과 전기 접촉하도록 기구(142)를 통해 계속된다(도 4c에 가장 잘 도시되어 있다). 이와 마찬가지로, 각 그루브(128)는 슬리브(92)의 결합 개방 단부(96)에 가장 가까운 단부에서 종료하고, 개구(144)가 하부 직방형 플레이트(120)의 표면에 형성되어 있다. 전기 터미널(130)은 하부 블록(100)이 동작 포지션에 있을 때 전기 콘택트(106)의 외부 콘택트 영역(138)과 전기 접촉하도록 개구

(144)를 통하여 계속된다. 슬리브(92)의 상부 표면 및 하부 표면의 중각 영역은 안에 직방형 개구(140)를 작고 있어 전기 터미널(126) 및 전기 터미널(130)은 상부 블록(98)과 하부 블록(100)이 각각 동작 포지션에 있을 때 전기 콘택트(102)와 전기 콘택트(106)과 전기 접촉한다.

블록(94)은 블록(94)를 동작 포지션으로 복원시키도록 구성된 복원 배열부(110)를 포함하고 있다. 복원 배열부(110)는 보통 각 블록(94)당 하나의 스프링식, 2개의 나선형상의 스프링을 포함하고 있다. 각 스프링은 각각의 블록(94)과 후방 하우징(116)의 중앙 직방형 플레이트(122) 사이에 배치되어 있다. 각 블록(94)은 폭 및 두께를 갖고 있다. 이 두께는 슬리브(92)의 결합 개방 단부(96)에서 노출된 표면의 최소 외부 치수로서 정의되어 있다. 각 블록(94)의 두께보다 큰 외부 직경을 갖는 나선형상의 스프링을 사용하는 것이 바람직하다. 이것은 보다 좁은 스프링이 충분히 강하지 않고 용이하게 구할 수도 없기 때문이다. 따라서, 블록(94)은 컷아웃부(112) 및 오버래핑부(114)를 그 후방에서 갖고 있다. 블록(94)의 컷아웃부(112)는 다른 블록(94)의 오버래핑부(114)를 수용하도록 구성되어 있고, 그리고 그 반대일 수도 있다(도 4c-e에 가장 잘 볼 수 있다). 이러한 방법으로, 각 블록(94)의 두께보다 큰 외경을 가진 나선형 스프링은 전체 가역 플러그(90)를 너무 크게 하지 않으면서 사용된다.

이제 도 4f 및 도 4g에 대해 설명한다. 도 4f는 A형 USB 스탠더드 리셉터클(34)내로 삽입되는 도 4a의 가역 플러그(90)의 평면도이다. 도 4g는 도 4f의 라인 G-G에 대한 단면도이다. 가역 플러그(90)의 A형 USB 스탠더드 리셉터클(34)과의 결합 방식에 따라, 블록(94)중 하나는 A형 USB 스탠더드 리셉터클(34)의 절연 블록(54)에 의해 수축 포지션으로 다시 밀려지게 된다. 다른 블록은 동작 포지션에 남아 있어 그 전기 콘택트는 A형 USB 스탠더드 리셉터클(34)의 전기 콘택트(50)과 접촉하게 된다. 도 4f 및 도 4g의 예에서, 가역 플러그(90)의 A형 USB 스탠더드 리셉터클(34)과의 제1 결합 방식으로 상부 블록(98)이 A형 USB 스탠더드 리셉터클(34)의 절연 블록(54)에 의해 수축 포지션으로 이동된다. 하부 블록(100)은 전기 콘택트(106)가 A형 USB 스탠더드 리셉터클(34)의 전기 콘택트(50)와 전기 접촉 상태로 있는 동작 포지션에 남아 있다.

마찬가지로, 가역 플러그(90) 또는 A형 USB 스탠더드 리셉터클(34)중 어느 하나가 뒤집어진다면, 가역 플러그(90)와 A형 USB 스탠더드 리셉터클(34)은 제2 결합 방식으로 결합한다. 이러한 제2 결합 방식으로 하부 블록(100)은 A형 USB 스탠더드 리셉터클(34)의 절연 블록(54)에 의해 수축 포지션으로 이동된다. 상부 블록(98)은 전기 콘택트(102)가 A형 USB 스탠더드 리셉터클(34)의 전기 콘택트(50)와 전기 접촉하는 동작 포지션에 남아 있게 된다.

블록(98,100)중 어느 하나가 동작 포지션으로부터 수축 포지션으로 다시 눌러지게 될 때, 전기 콘택트(102) 및 전기 콘택트(106)는 전기 터미널(126) 및 전기 터미널(130) 각각으로부터 전기적으로 이격된다.

이제 도 9a-9h에서, 본 발명의 바람직한 실시예에 따라 구성되고 동작가능한 가역 디바이스를 도시하는 개략적인 블록도를 볼 수 있다. 용어 USB 디바이스는 USB 플러그를 포함하는 장치로서 여기에 정의되어 있고, USB 어플라이언스는 여기에 USB 리셉터클을 포함하는 장치로서 여기에 정의되어 있다는 것에 주목해야 한다. 가역 USB 디바이스(306)는 기능 유닛(308)을 포함하고 있다. 기능 유닛(308)은 적어도 하나의 기능을 실행하도록 구성되고, 그중 하나의 예는 가역 USB 디바이스(306)에 데이터 패키지를 저장하는 것이다. 가역 USB 디바이스(306)는 기능 유닛(308)에 접속되고 기능 유닛(308)을 어플라이언스(302)와 상호접속하도록 사용되는 가역 USB 플러그(304)를 더 포함하고 있다. 가역 플러그(304)는 이들의 가능한 상술된 실시예중 어느 하나 또는 이들의 가능한 변형예중 하나와 합치한다. 가역 디바이스(306)는 또한 기능 유닛(308)을 위한 물리적 수용부 및 하우징으로서 기능하는 본체(309)를 구성한다. 본체(309)는 사용자에 의해 잡히도록 구성되어 있고, 물리적 엘리먼트는 가역 USB 디바이스(306)를 어플라이언스(302)와 맞물리도록 할 때 사용자에게 의해 유지되는 물리적 엘리먼트이다. 가역 플러그(304)는 강성 방식으로, 또는 적어도 비회전 방식으로 본체(309)로부터 직접 돌출하고, 본체(309)의 사이드에 대하여 비대칭적으로 배치되는데, 이 비대칭 위치지정은 미적 또는 기능적 이유 때문이다. 어플라이언스(302)는 스탠더드 USB 리셉터클(300)을 포함한다. 도 9a는 어플라이언스(302)에 대하여 제1 결합 방식으로 위치지정되고 삽입을 위해 정렬된 가역 USB 디바이스(306)를 도시하고 있다. 그러나, 어플라이언스(302)는 제1 결합 방식으로 가역 USB 디바이스(306)가 스탠더드 USB 리셉터클(300)내로 삽입되는 것을 방지하는 물리적 구조를 가지고 있다. 가역 디바이스(306)의 결합 방식은 도 9에 도시된 바와 같이, 디바이스(306)를 뒤집음으로써 교환된다. 제2 결합 방식(도 9c)에서, 어플라이언스(302)의 물리적 구조는 가역 USB 디바이스(306)의 스탠더드 USB 리셉터클(300)내로의 삽입을 방지하지 않는다. 제1 및 제2 결합 방식 모두로 스탠더드 리셉터클내로 삽입될 수 있는 가역 USB 플러그(304)는 스탠더드 리셉터클(300; 도 9d)과 결합되어 지정된 방식으로 디바이스(306) 및 어플라이언스(302)를 접속시킨다. 도 9e-9h는 가역 USB 디바이스(306)와 스탠더드 USB 리셉터클을 포함하는 어플라이언스를 결합하는 또 다른 예를 도시한다. 어플라이언스(314)는 가역 디바이스(306)의 가역 USB 플러그(304)와 결합될 스탠더드 USB 리셉터클(310)을 포함한다. 어플라이언스(314)는 또 다른 스탠더드 USB 리셉터클(312)를 더 포함한다. 도 9e에서 볼 수 있는 바와 같이, 가역 USB 디바이스(306)는 제1 결합 방식으로 스탠더드 USB 리셉터클(310)과 정렬되어 있다. 이러한 방식에서, 가역 USB 디바이스(306)의 본체는 이웃하는 스탠더드 리셉터클(310, 312)의 근접도로 인해 스탠더드 USB 리셉터클(312)의 중공 개구를 차단한다. 따라서, USB 플러그(도시되지 않음)를 채용하는 또 다른 디바이스는 스탠더드 리셉터클(312)내로 삽입되어 결합

될 수 없다. 리셉터클(312)은 예시이고 가역 USB 디바이스(306)의 물리적 구조에 의해 차단되는 임의의 포트, 디스플레이, 또는 일반적인 특징부일 수 있음에 주목해야 한다. 가역 USB 디바이스(306)의 결합 방식은 스탠더드 리셉터클(300: 도 9f)로부터 디바이스(306)를 추출하고 이것을 도 9b에 설명된 바와 동일한 방식으로 뒤집음으로써 변경된다. 도 9h는 제2 결합 방식으로 스탠더드 USB 리셉터클(310)과 결합된 가역 USB 디바이스(306), 차단되지 않은 리셉터클(312)을 도시하고 있고, 그래서 또 다른 USB 디바이스(도시되지 않음)와의 결합을 허용한다.

다음 4개의 실시예는 A형 USB 스탠더드 플러그와 결합하기 위한 가역 리셉터클의 실시예에 관한 것이다.

이제 도 5a 및 도 5b에 대해 설명한다. 도 5a는 본 발명의 바람직한 실시예에 따라 구성되고 동작가능한 가역 리셉터클(소켓; 146)의 등각사시도이다. 도 5b는 도 5a의 가역 리셉터클의 분해 등각사시도이다. 가역 리셉터클(146)은 도 5a 내지 5e 및 아래에 설명된 차이를 제외하고 도 1a-f의 가역 플러그(10)와 실질상 동일하다. 가역 리셉터클(146)은 슬리브(148)를 가지고 있다. 슬리브(148)는 A형 USB 스탠더드 리셉터클(34)의 실드(52)와 유사한 전기도전성 실드이다. 가역 리셉터클(146)은 중앙 절연층(152)의 상부 사이드(158)상의 그루브(156)내에 배치된 전기 콘택트(154)의 세트와 중앙 절연층(152)의 하부 사이드(162)상의 그루브내에 배치된 전기 콘택트(166)의 또 다른 세트와 함께 중앙 절연층(152)을 갖는 텅 배럴부(150)를 가지고 있다. 텅 배럴부(150)는 텅 배럴부(150)가 상하로 이동할 수 있도록 힌지되어 있다. 가역 리셉터클(146)은 가역 플러그(10)의 센터링 메커니즘(18)과 실질상 동일하게 동작하는 센터링 메커니즘(164)을 갖고 있다.

이제 도 5c 및 도 5d에 대해 설명한다. 도 5c는 A형 USB 스탠더드 플러그(168)와 접촉하는 도 5a의 가역 리셉터클(146)의 평면도이다. 도 5d는 도 5c의 라인 D-D에 대한 단면도이다. A형 USB 스탠더드 플러그(168)는 전기 도전 실드(172)에 의해 3개의 측방에서 둘러싸인 중공부(170)를 갖고 있다. 위에 4개의 전기 콘택트(176)의 세트를 갖고 있는 블록(174)은 중공부(170)의 4개의 사이드상에 배치되어 있다. 블록(174)은 실드(172)의 센터쪽으로 정사진 예지(178)를 갖고 있다. 가역 리셉터클(146)이 A형 USB 스탠더드 플러그(168)내에 삽입되어 있기 때문에, 센터링 메커니즘(164)은 해제되고 A형 USB 스탠더드 플러그(168)의 블록(174)의 정사진 예지(178)는 텅 배럴부(150)를 윗방향으로 밀어올린다.

이제 완전히 결합된 도 5c의 가역 리셉터클(146) 및 A형 USB 스탠더드 플러그(168)의 단면도인 도 5e에 대해 설명한다. 먼저, A형 USB 스탠더드 리셉터클(34)의 전기 콘택트(50)은 A형 USB 스탠더드 리셉터클(34)의 중공부(48)내에 삽입되는 플러그의 플랫 콘택트와 전기 접촉하는 돌출부(51)를 갖고 있다. A형 USB 스탠더드 리셉터클(34)의 콘택트가 돌출부를 가지고 있지 않다면, A형 USB 스탠더드 리셉터클(34)과 USB 플러그의 플랫 콘택트 사이의 접촉은 이루어지지 않는다. 따라서, 가역 리셉터클(146)의 전기 콘택트(154) 및 전기 콘택트(166)는 전기 콘택트(154) 및 전기 콘택트(166)가 A형 USB 스탠더드 플러그의 플랫 콘택트와 접촉하도록 돌출부를 가질 필요가 있다. 그러나, 전기 콘택트(154)와 전기 콘택트(166)가 돌출부를 가졌다면, 그 콘택트와 마주하는 스탠더드 플러그의 금속 슬리브 표면이 이러한 돌출부를 수용하도록 홈을 가질 필요가 없기 때문에 가역 리셉터클(146) 및 A형 USB 스탠더드 플러그(168)의 결합을 방해할 것이다. 또한, 제1 방식으로 A형 USB 스탠더드 플러그(168)를 삽입하면 전기 콘택트(154)의 돌출부가 A형 USB 스탠더드 플러그(168)의 실드(172)와 접촉하게 되어 가역 리셉터클(146)의 전기 콘택트를 단락시키게 되고, 제2 방식으로 스탠더드 플러그(168)를 삽입할 때 이와 유사한 상황이 발생하게 된다. 그러므로, 전기 콘택트(154) 및 전기 콘택트(166)는 일반적으로 중앙 절연층(152)의 표면 아래에서 홈을 갖게 되고 아래에 기술되는 바와 같이, 필요하다면 중앙 절연층(152)으로부터 선택적으로 편향되도록 구성된다.

가역 리셉터클(146)은 콘택트 상승 배럴부(180)를 포함하고 있다. 도 5e의 예에서, 가역 리셉터클(146)은 A형 USB 스탠더드 플러그(168)와 제1 결합 방식상태에 있다. 콘택트 상승 배럴부(180)는 텅 배럴부(150)로부터 전기 콘택트(166)를 편향시키도록 구성되어서, 전기 콘택트(166)는 A형 USB 스탠더드 플러그(168)의 전기 콘택트(176)와 기계적으로 접촉하게 된다. 용어 "텅 배럴부로부터 편향시키다"는 중앙 절연층(152)로부터 전기 콘택트를 멀어지도록 이동시키는 것으로 여기에 정의되어 있다. 구 "콘택트 상승"은 전기 접촉을 이를 상응하는 표면쪽으로 콘택트 영역을 제공하는 하나 이상의 금속 스트립을 국부적으로 편향시키는 것으로 지칭하는 것으로 여기에 정의되어 있다. 전기 콘택트(154)는 중앙 절연층(152) 아래에 홈을 갖도록 되어 있어서 전기 콘택트(154)는 A형 USB 스탠더드 플러그(168)의 실드(172)로부터 전기적으로 절연되어 있다.

이와 마찬가지로, 가역 리셉터클(146) 및 A형 USB 스탠더드 플러그(168)의 제2 결합 방식(도시되지 않음)로, 전기 콘택트(154)는 텅 배럴부(150)로부터 편향되어, 전기 콘택트(154)는 A형 USB 스탠더드 플러그(168)의 전기 콘택트(176)와 기계적으로 접촉하게 된다. 전기 콘택트(166)는 중앙 절연층(152) 아래에 홈을 갖게 되어서 전기 콘택트(166)는 A형 USB 스탠더드 플러그(168)의 실드(172)로부터 전기적으로 절연된다.

콘택트 상승 배럴부(180)는 다음과 같이 전기 콘택트(154) 및 전기 콘택트(166)의 일부로서 형성되어 있다. 각각의 전기 콘택트(154, 166)는 루프(182)를 형성하기 위해 그 중간쪽으로 더블 오버부를 갖고 있다. 각 루프(182)는 절연캡(183)에

의해 덮여 있다. 루프(182)는 가역 리셉터클(146)이 A형 USB 스탠더드 플러그(168)와 완전히 결합되기 바로 전에 블록(174)에 의해 눌린다. 눌림 루프(182)는 연관된 콘택트를 텅 배럴부(150)로부터 편향시킨다. 예를 들어, 제1 결합 방식으로, 전기 콘택트(166)의 루프(182)는 블록(174)에 의해 눌러서 전기 콘택트(166)를 텅 배럴부(150)로부터 편향시킨다. 그러나, 전기 콘택트(154)의 루프(182)는 이동되지 않고 따라서 전기 콘택트(154)는 텅 배럴부(150)내에서 홈을 갖게 된다.

이제 도 6a-6c에 대해 설명한다. 도 6a는 본 발명의 제1 대안의 실시예에 따라 구성되고 동작가능한 가역 리셉터클(184; 관련 회로 기판이 없는 상태)의 등각사시도이다. 도 6b는 도 6a(관련 회로기판(186)이 있는 상태)의 가역 리셉터클(184)의 평면도이다. 도 6c는 도 6c의 가역 리셉터클(184)의 분해 등각사시도이다. 가역 리셉터클(184)는 도 6a 내지 도 6c에 도시되고 아래에 설명된 차이를 제외하고 도 2a-2f의 가역 플러그(58)와 실질상 동일하다. 가역 리셉터클(184)은 도 5a의 가역 리셉터클(146)의 슬리브(148)과 실질상 동일 슬리브(185)를 갖고 있다. 가역 리셉터클(184)은 슬리브(185)내에 중앙에 배치된 텅 배럴부(188)를 갖고 있다. 텅 배럴부(188)는 콘택트 영역의 상부 세트(190) 및 콘택트 영역의 하부 세트(192)를 갖고 있다. 콘택트 영역(190)의 상부 세트 및 콘택트 영역(192)의 하부 세트는 리프 스프링 전기 콘택트 배럴부(194)를 형성한다. 텅 배럴부(188)는 텅 배럴부(188)의 틈에 배치된 절연 캡(196)을 갖고 있다. 절연 캡(196)은 도 6d 및 도 6e를 참조하여 보다 상세하게 설명되어 있다. 콘택트 영역의 상부 세트(190) 및 콘택트 영역의 하부 세트(192)의 각 콘택트는 텅 배럴부(188)로부터 돌출하는 복수의 루프(198)를 형성하기 위해 각 콘택트의 중간을 향해 더를 오비되어 있다. 콘택트 영역의 상부 세트(190)의 루프(198)는 절연 커버(200)로 덮여 있다. 이와 마찬가지로, 콘택트 영역의 하부 세트의 루프(198)는 절연 커버(202)로 덮여 있다. 절연 커버(200, 202)는 상기 플러그의 외부 실딩에 대하여 단락되는 루프(198)로부터의 보호를 제공한다. 루프(198), 절연 커버(200) 및 절연 커버(202)는 도 6e를 참조하여 보다 상세하게 설명된 텅 기둥기(208)를 형성한다.

4개의 전기 터미널(204)의 세트는 수반하는 회로기판(186)상에 배치되어 있다. 전기 터미널(204)은 전자 스위칭 배럴부(206) 및 리프 스프링 전기 콘택트 배럴부(194)의 후방에 접속되어 있다. 전자 스위칭 배럴부(206)는 도 2f의 가역 플러그(58)의 전자 스위칭 배럴부(70)와 동일한 기능을 수행한다.

이제 A형 USB 스탠더드 플러그(168)와 접촉하는 라인 D-D에 대한 도 6b의 가역 리셉터클(184)의 단면도인 도 6d에 대해 설명한다. A형 USB 스탠더드 플러그(168)는 가역 리셉터클(184)내로 삽입됨에 따라, 텅 배럴부(188)는 A형 USB 스탠더드 플러그(168)의 블록(174)의 수평 예지(178)에 의해 위로 밀어올려진다. 텅 배럴부(188)는 텅 배럴부(188)가 A형 USB 스탠더드 플러그(168)의 실드(172)에 닿도록 위로 밀어올려진다. 따라서, 절연 캡(196)은 텅 배럴부(188)가 A형 USB 스탠더드 플러그(168)의 중공부(170)와 결합할 때 리프 스프링 전기 콘택트 배럴부(194)와 A형 USB 스탠더드 플러그(168)의 실드(172) 사이의 전기 접촉을 방지하도록 구성되어 있다. 즉, 절연 캡(196) 및 리프 스프링 전기 콘택트 배럴부(194)는 텅 배럴부(188)의 중앙 평면이 실드(172)와 예각을 만들 때 실드(172)와 접촉하는 텅 배럴부(188)의 제1 부분이 절연 캡(196)이 되도록 구성되어 있다. 따라서, 리프 스프링 전기 접촉 배럴부(194)는 실드(172)와 접촉되는 일이 방지된다.

이제 완전히 결합된 도 6d의 A형 USB 스탠더드 플러그(168) 및 가역 리셉터클(184)의 단면도인 도 6e에 대해 설명한다. A형 USB 스탠더드 플러그(168)는 가역 리셉터클(184)의 중공부(170)내로 더 밀어짐에 따라, A형 USB 스탠더드 플러그(168)의 블록(174)는 텅 기둥기(208)를 밀게 된다. 차례로, 텅 기둥기(208)는 텅 배럴부(188)를 A형 USB 스탠더드 플러그(168)의 전기 콘택트(176)쪽으로 아래로 다시 향하게 하여 텅 배럴부(188)의 중앙 평면은 거의 수평이 된다. 절연 캡(196) 및 리프 스프링 전기 콘택트 배럴부(194)는 텅 배럴부(188)이 그 중앙 평면이 거의 수평이 되도록 아래로 다시 향함에 따라 전기 콘택트(176)와 접촉하는 텅 배럴부(188)의 제1 부분이 리프 스프링 전기 콘택트 배럴부(194)가 되도록 구성된다. 따라서, 절연 캡(196)은 리프 스프링 전기 콘택트 배럴부(194)가 전기 콘택트(176)와 접촉방지하지 않는다. 따라서, 절연 캡(196) 및 리프 스프링 전기 콘택트 배럴부(194)는, (a) 텅 배럴부(188)가 실드(172)쪽으로 위로 향하고 있을 때 리프 스프링 전기 콘택트 배럴부(194) 사이의 접촉을 방지하고, (b) 텅 배럴부(188)가 아래로 향할 때 리프 스프링 전기 콘택트 배럴부(194)와 전기 콘택트(176) 사이의 접촉을 허용하도록 구성될 필요가 있다. 리프 스프링 전기 콘택트 배럴부(194) 및 절연 캡(196)은 텅 배럴부(188)의 중앙 평면에 대하여 대칭이어서 제2 결합 방식으로 리프 스프링 전기 콘택트 배럴부(194)가 전기 콘택트(176)와 접촉하지만, 리프 스프링 전기 콘택트 배럴부(194)가 실드(172)와 접촉하지 않게 된다.

이제 도 6f 내지 도 6i에 대해 설명한다. 도 6f는 본 발명의 제2 대안의 실시예에 따라 구성되고 동작가능한 가역 리셉터클(264)의 단면도이다. 도 6g는 도 6f의 가역 리셉터클(264)의 분해 등각사시도이다. 도 6h는 도 6f의 가역 리셉터클(264)의 텅 배럴부(266)의 후방 등각사시도이다. 도 6i는 도 6h의 텅 배럴부(266)의 전방 등각사시도이다. 가역 리셉터클(264)은 도 6f 내지 도 6i에 도시되고 아래에 설명된 차이를 제외하고 도 6a 내지 도 6e의 가역 리셉터클(184)과 실질상 동일하다. 텅 배럴부(266)는 전기 콘택트 영역(272)의 세트와 전기 콘택트 영역(274)의 세트 사이에 배치된 절연층(27)을 갖고 있다. 전기 콘택트 영역(272)의 세트 및 전기 콘택트 영역(274)의 세트는 리프 스프링 전기 콘택트 배럴부(276)로서 형성되어 있다. 전기 콘택트 영역(272)의 세트 및 전기 콘택트 영역(274)의 세트는 텅 배럴부(266)의 틈(278)에서 전기적으로

접속되어 있지 않다. 가역 리셉터클(184)에서와 같이, 가역 리셉터클(184)의 텅 배열부(266)의 주요 기계적 엘리먼트는 리프 스트링 전기 콘택트 배열부(276)로서 기능하는 금속 스트립의 세트이다. 절연층(270)은 주로 텅 배열부(266)의 가요 부상에서 전기 콘택트(272)의 세트 및 전기 콘택트 영역(274)의 세트를 전기 절연시키기 위한 것이다. 또한 가역 리셉터클(264)은 4개의 터미널(282)가 위에 배치된 인쇄회로기판 인터페이스 커넥터 배열부(280)를 포함하고 있다. 각 터미널(282)은 인쇄회로기판(284)에 접속하도록 구성되어 있다. 인쇄회로기판 인터페이스 커넥터 배열부(280)는 터미널(282)에 전기 콘택트 영역(272)의 세트 및 전기 콘택트 영역(274)의 세트의 상응하는 접촉 영역을 전기적으로 접속시키기 위한 크로스오버 배열부(286)를 갖고 있다. 따라서, 가역 리셉터클(264)이 A형 USB 스탠더드 플러그(264)에 삽입되는 어느 결합 방위에서든, A형 USB 스탠더드 플러그의 동일한 터미널이 인쇄회로기판 인터페이스 커넥터 배열부(280)의 동일한 터미널(282)과 전기 접촉상태에 있게 된다.

이제 도 7a-c에 대해 설명한다. 도 7a는 본 발명의 제3 실시예에 따라 구성되고 동작가능한 가역 리셉터클(210)의 등각사시도이다. 도 7b는 도 7a의 가역 리셉터클(210)의 평면도이다. 도 7c는 도 7b의 라인 C-C에 대한 단면도이다. 가역 리셉터클(210)은 가역 리셉터클(210)이 상술된 콘택트 상승 메커니즘과 유사한 메커니즘을 사용하여 가역 리셉터클(210)의 양측상에서 선택적으로 상승가능한 콘택트(212)를 갖는다는 것을 제외하고는 가역 플러그(74)와 실질상 동일하다. 또한, 가역 리셉터클(210)은 가역 플러그(74)와 함께 포함된 가역 표면 돌출부를 갖지 않는다.

이제 A형 USB 스탠더드 플러그(168)와 결합된 도 7c의 가역 리셉터클(210)의 단면도인 도 7d에 대해 설명한다. 도 7d는 A형 USB 스탠더드 플러그(168)와의 가역 리셉터클(210)의 제1 결합 방위를 도시하고 있다. 하부 상승가능 콘택트(212)는 A형 USB 스탠더드 플러그(168)의 전기 콘택트(176)와 접촉하기 위해 가역 리셉터클(210)의 인터페이스 엘리먼트로부터 편향된다. 상부 상승가능 콘택트(212)는 A형 USB 스탠더드 플러그(168)의 실드(172)와의 단락을 방지하기 위해 가역 리셉터클(210)의 인터페이스 엘리먼트내에 홈을 갖고 있다.

이제 도 8a-c에 대해 설명한다. 도 8a는 본 발명의 제4 대안의 실시예에 따라 구성되고 동작가능한 가역 리셉터클(214)의 등각사시도이다. 도 8b는 도 8a의 가역 리셉터클(214)의 분해 등각사시도이다. 도 8c는 도 8b의 가역 리셉터클(214)의 하부 블록(216)의 분해 등각사시도이다. 가역 리셉터클(214)은 도 8a 내지 도 8g에 도시되고 아래에 설명된 차이를 제외하고 도 4a-4g의 가역 플러그(90)와 실질상 동일하다. 가역 리셉터클(214)은 도 5a의 슬리브(148)과 동일한 슬리브(220)를 갖고 있다. 슬리브(220)가 가역 플러그(90)의 슬리브(92)보다 짧기 때문에, 가역 플러그(90)내에 배치된 직방향 개구(140)는 슬리브(220)내에 필요하지 않다. 또한, 가역 리셉터클(214)은 A형 USB 스탠더드 플러그(168)의 플랫 전기 콘택트(176)와 결합함에 따라, 가역 리셉터클(214)의 콘택트는 상승가능해질 필요가 있다. 가역 리셉터클(214)은 하부 블록(216) 및 상부 블록(218)을 포함하고 있다. 하부 블록(216)은 루프를 가진 4개의 홈이 파진 전기 콘택트(222)의 세트를 갖고 있다. 상부 블록(218)은 루프를 가진 4개의 홈이 파진 전기 콘택트(224)의 세트를 갖고 있다. 전기 콘택트(222)의 루프는 2개의 기동 레버(228)이 위에 있는 절연 엘리먼트(226)를 통해 기계적으로 접속되어 있다. 기동 레버(228)는 가역 리셉터클(214) 및 A형 USB 스탠더드 플러그(168)가 전기 콘택트(222)를 상승시키도록 결합될 때 A형 USB 스탠더드 플러그(168)에 의해 밀어지도록 구성되어 있다. 이와 마찬가지로, 전기 콘택트(224)는 2개의 기동 레버(232)가 위에 있는 절연 엘리먼트(230)를 통해 접속되어 있다. 상부 블록(218)은 하부 블록(216) 및 상부 블록(218)의 상대적인 이동 동안 하부 블록(216)의 전기 콘택트(222)의 기동 레버(228)를 수용하기 위해 전기 콘택트(224)의 그루브 사이에 배치된 2개의 그루브(234)를 포함하고 있다. 이와 마찬가지로, 하부 블록(216)은 하부 블록(216) 및 상부 블록(218)의 상대적인 이동 동안 상부 블록(218)의 전기 콘택트(224)의 기동 레버(232)를 수용하기 위해 전기 콘택트(222)의 그루브 사이에 배치된 2개의 그루브(236)를 포함하고 있다.

이제 도 8d-e에 대해 설명한다. 도 8d는 A형 USB 스탠더드 플러그(168)와 접촉하는 도 8a의 가역 리셉터클(214)의 평면도이다. 도 8e는 도 8d의 라인 E-E에 대한 단면도이다.

이제 도 8f 및 8g에 대해 설명한다. 도 8f는 완전히 결합된, 도 8d의 A형 USB 스탠더드 플러그(168) 및 가역 리셉터클(214)의 단면도이다. 도 8g는 도 8f의 A형 USB 스탠더드 플러그(168)와 완전히 결합될 때 (명확히 하기 위해 슬리브(220)가 제거된) 도 8f의 가역 리셉터클(214)의 등각사시도이고, A형 USB 스탠더드 플러그(168)는 명확히 하기 위해 제거되었다. 도 8f 및 도 8g는 A형 USB 스탠더드 플러그(168) 및 가역 리셉터클(214)의 제1 결합 방위를 도시한다. 상부 블록(218)은 A형 USB 스탠더드 플러그(168)의 블록(174)에 의해 수축 포지션으로 다시 밀어져 있다. 또한, 블록(174)은 전기 콘택트(222)가 A형 USB 스탠더드 플러그(168)의 전기 콘택트(176)와 기계 및 전기 접촉하도록 하부 블록(216)으로부터 전기 콘택트(222)를 상승시키는 기동 레버(228)를 만든다.

이와 마찬가지로, 제2 결합 방위로 전기 콘택트(224)는 상부 블록(218)로부터 상승되어 전기 콘택트(224)가 A형 USB 스탠더드 플러그(168)의 전기 콘택트(176)와 접촉하게 된다.

이제 스탠더드 USB 플러그를 포마하는 디바이스에 관하여 가역 USB 리셉터를 통합하고 있는 어플라이언스를 도시하고 있는 대략적인 블록도인 도 10에 대해 설명한다. 가역 USB 어플라이언스(324)는 기능 유닛(321)을 포함하고 있다. 기능 유닛(321)은 기계적 동작을 실행하고 있는 적어도 하나의 기능을 실행하도록 구성되어 있지만, 이에 제한되지는 않는다. 어플라이언스(324)는 기능 유닛(321)에 접속되어 있고 기능 유닛(321)을 USB 디바이스(320)와 상호접속하도록 사용되는 가역 USB 리셉터(326)를 더 포함하고 있다. 가역 리셉터(326)은 상술된 실시예중 어느 하나 또는 이들의 가능한 변형중 하나와 합치한다. 가역 USB 어플라이언스(324)는 또한 기능 유닛(321)을 위한 물리적 수용물 및 하우징으로서 기능하는 본체(325)를 구성한다. 가역 리셉터(326)은 보통 가역 USB 어플라이언스(324)의 본체(325)와 강성 결합되어 있다. USB 디바이스(320)는 가역 USB 리셉터(326)과 결합될 스탠더드 USB 플러그(322)를 포함하고 있다. 어플라이언스(324)는 2개의 결합 방위로 USB 디바이스(320)의 결합을 허용하여, 도 9a-9h에 대하여 설명된 바와같은 대안 결합과 동일한 유익한 효과를 생성한다.

본 발명이 여기에 특별히 도시되고 설명된 것에 제한되지 않는다는 것을 당업자는 이해할 것이다. 본 발명의 범위는 상기 설명을 읽을 때 당업자가 가능한 종래기술에 없는 변형 및 수정은 물론, 여기에 설명된 다양한 특징의 조합 및 서브 조합 모두를 포함하고 있다.

도면의 간단한 설명

본 발명은 첨부된 도면을 참조하여 단지 예시로서 여기에 설명되었다.

도 1a은 본 발명의 바람직한 실시예에 따라 구성되고 동작가능한 가역 플러그의 등각사시도,

도 1b는 도 1a의 가역 플러그의 평면도,

도 1c는 도 1b의 라인 C-C에 대한 단면도,

도 1d는 도 1a의 가역 플러그의 분해 등각사시도,

도 1e는 (명확히 하기 위해 그 외부 하우징이 제거된) A형 USB 스탠더드 리셉터와 접촉하는 (역시 명확히 하기 위해 그 외부 하우징이 제거된) 도 1a의 가역 플러그의 등각사시도,

도 1f는 도 1e의 가역 플러그 및 리셉터의 대략 반투명 측면도,

도 2a는 본 발명의 제1 대안 실시예에 따라 구성되고 동작가능한 가역 플러그의 등각사시도,

도 2b는 도 2a의 가역 플러그의 정면도,

도 2c는 도 2b의 라인 C-C에 대한 단면도,

도 2d는 A형 USB 스탠더드 리셉터와 접촉하는 도 2a의 가역 플러그의 단면도,

도 2e는 완전히 결합된 도 2d의 가역 플러그 및 리셉터의 단면도,

도 2f는 (명확히 하기 위해 그 외부 하우징이 제거된) 완전히 결합된 도 2e의 가역 플러그 및 리셉터의 등각사시도,

도 2g는 도 2a의 가역 플러그와 함께 사용하기 위한 전자 스위칭 배열의 개략도,

도 2h는 A형 USB 스탠더드 리셉터와 접촉하는, 본 발명의 제2 대안의 실시예에 따라 구성되고 동작가능한 가역 플러그의 단면도,

도 2i는 완전히 결합된 도 2h의 가역 플러그 및 리셉터의 단면도,

도 2j는 (명확히 하기 위해 그 외부 하우징이 제거된) 완전히 결합된 도 2h의 가역 플러그 및 리셉터의 등각사시도,

도 2k는 도 2h의 가역 플러그의 텅 배열의 상면도,

도 2m은 도 2k의 텅 배열의 등각사시도,

도 3a는 본 발명의 제3 대안의 실시예에 따라 구성되고 동작가능한 가역 플러그의 등각사시도,

도 3b는 도 3a의 가역 플러그의 평면도,

도 3c는 도 3b의 라인 C-C에 대한 단면도,

도 3d는 도 3b의 라인 D-D에 대한 단면도,

도 3e는 A형 USB 스탠더드 리셉터클내로 삽입되는 도 3a의 가역 플러그의 평면도,

도 3f는 도 3e의 라인 F-F에 대한 단면도,

도 4a는 본 발명의 제4 대안의 실시예에 따라 구성되고 동작가능한 가역 플러그의 등각사시도,

도 4b는 도 4a의 가역 플러그의 평면도,

도 4c는 도 4b의 라인 C-C에 대한 단면도,

도 4d는 도 4c의 라인 D-D에 대한 단면도,

도 4e는 도 4a의 가역 플러그의 분해도,

도 4f는 A형 USB 스탠더드 리셉터클내로 삽입되는 도 4a의 가역 플러그의 평면도,

도 4g는 도 4f의 라인 G-G에 대한 단면도,

도 5a는 본 발명의 바람직한 실시예에 따라 구성되고 동작가능한 가역 리셉터클의 등각사시도,

도 5b는 도 5a의 리셉터클의 분해 등각사시도,

도 5c는 A형 USB 스탠더드 플러그와 접촉하는 도 5a의 리셉터클의 평면도,

도 5d는 도 5c의 라인 D-D에 대한 단면도,

도 5e는 완전히 결합된 도 5c의 리셉터클 및 플러그의 단면도,

도 6a는 본 발명의 제1 대안의 실시예에 따라 구성되고 동작가능한 (회로 기판이 함께 하지 않은) 가역 리셉터클의 등각사시도,

도 6b는 (회로 기판과 함께한) 도 6a의 리셉터클의 평면도,

도 6c는 도 6c의 리셉터클의 분해 등각사시도,

도 6d는 A형 USB 스탠더드 플러그와 접촉하는 라인 D-D에 대한 도 6b의 리셉터클의 단면도,

도 6e는 완전히 결합된 도 6d의 플러그 및 리셉터클의 단면도,

도 6f는 본 발명의 제2 대안의 실시예에 따라 구성되고 동작가능한 가역 리셉터클의 단면도,

도 6g는 도 6f의 리셉터클의 분해 등각사시도,

도 6h는 도 6f의 리셉터클의 텅 배열의 후방 등각사시도,

도 6i는 도 6h의 텅 배열의 정면 등각사시도,

도 7a는 본 발명의 제3 대안의 실시예에 따라 구성되고 동작가능한 가역 리셉터클의 등각사시도,

도 7b는 도 7a의 리셉터클의 평면도,

도 7c는 도 7b의 라인 C-C에 대한 단면도,

도 7d는 A형 USB 스탠더드 플러그와 결합된 도 7c의 리셉터클의 단면도,

도 8a는 본 발명의 제4 대안의 실시예에 따라 구성되고 동작가능한 가역 리셉터클의 등각사시도,

도 8b는 도 8a의 리셉터클의 분해 등각사시도,

도 8c는 도 8b의 리셉터클의 하부 블록의 분해 등각사시도,

도 8d는 A형 USB 스탠더드 플러그와 접촉하는 도 8a의 리셉터클의 평면도,

도 8e는 도 8d의 라인 E-E에 대한 단면도,

도 8f는 완전히 결합된 도 8d의 리셉터클 및 플러그의 단면도,

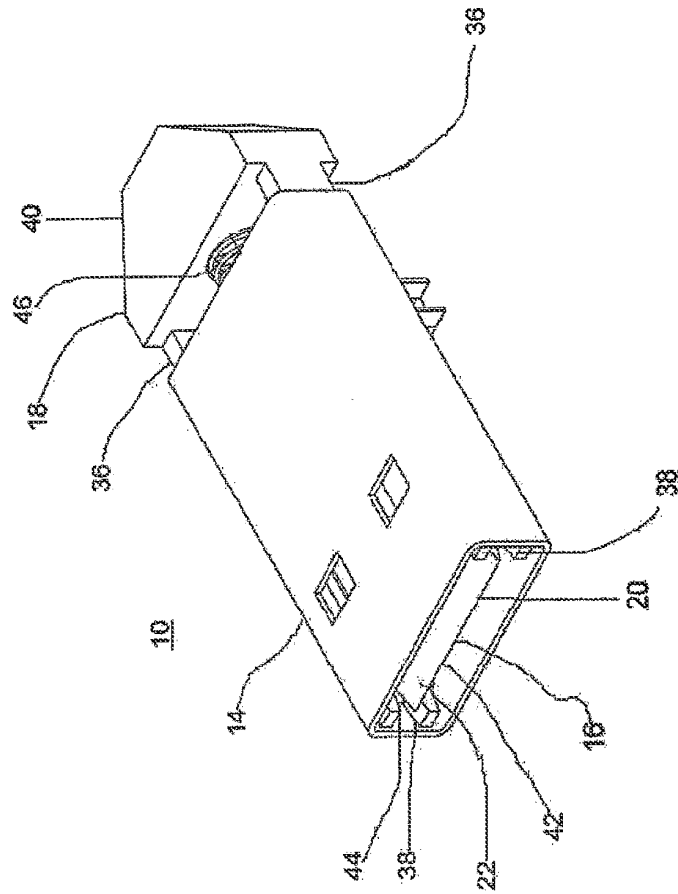
도 8g는 명확히 하기 위해 제거된 도 8f의 플러그와 완전히 결합되었을 때의 (명확히 하기 위해 실드가 제거된) 도 8f의 리셉터클의 등각사시도,

도 9a~도 9h는 본 발명의 바람직한 실시예에 따라 구성되고 동작가능한 가역 디바이스의 일반적인 대략적인 도면, 및

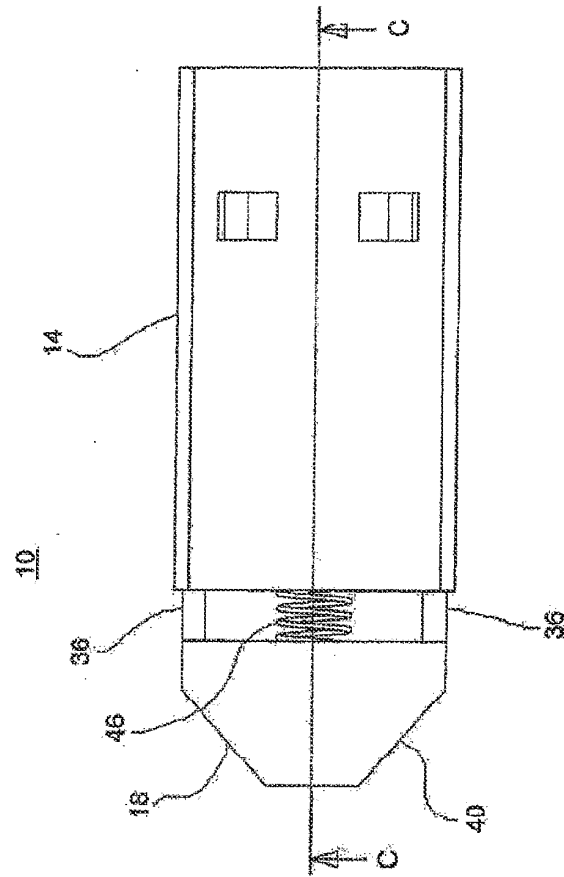
도 10은 본 발명의 바람직한 실시예에 따라 구성된 가역 리셉터클을 통합한 어플라이언스의 일반적인 대략적인 도면.

도면

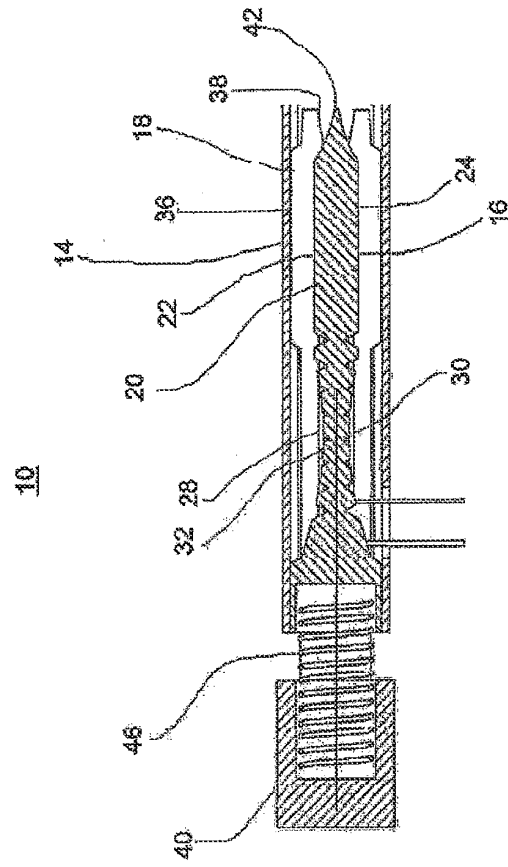
도면1a



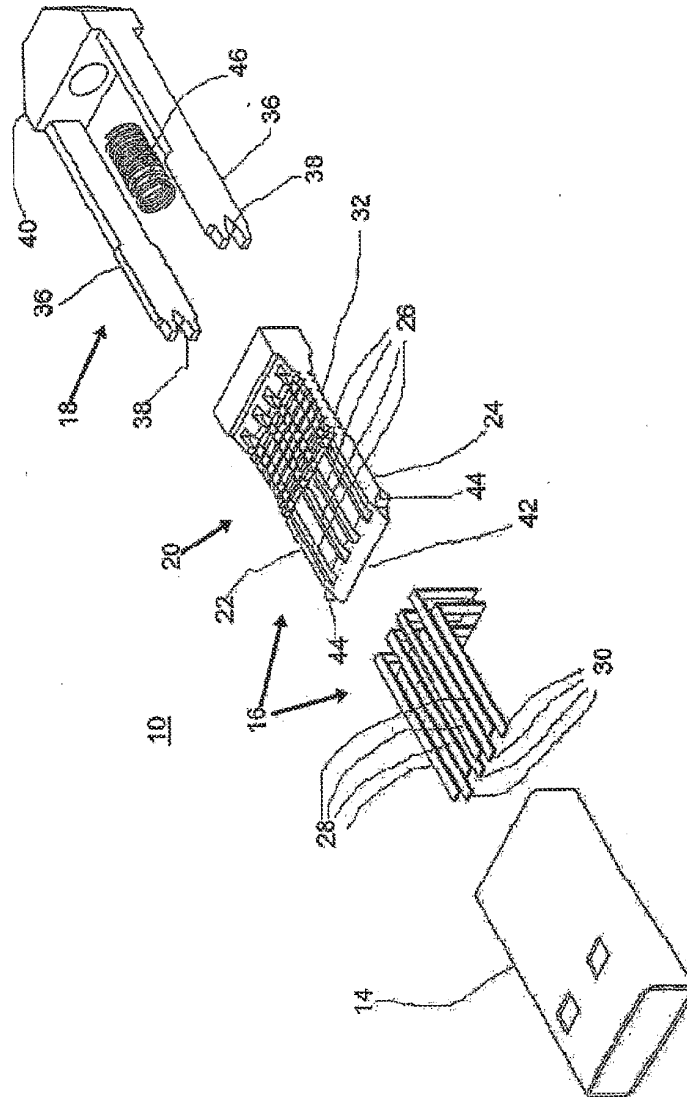
도면 1b



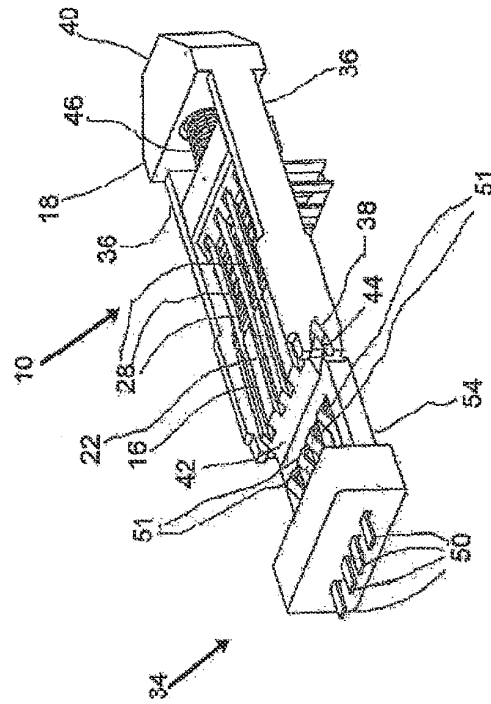
도면1c



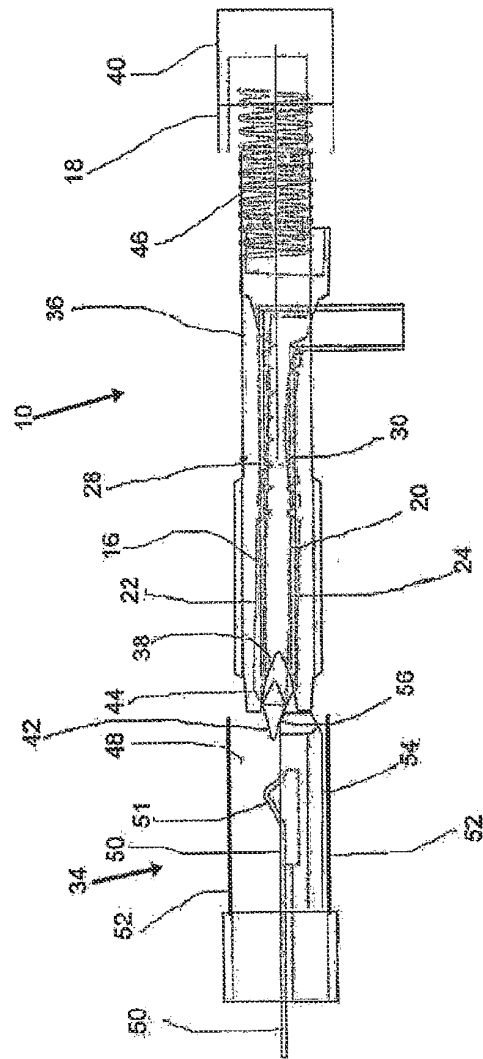
도면14



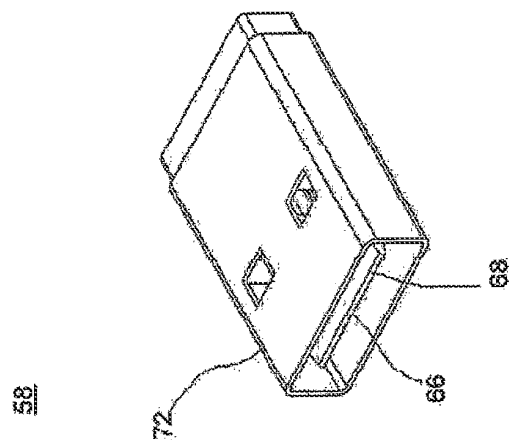
52016



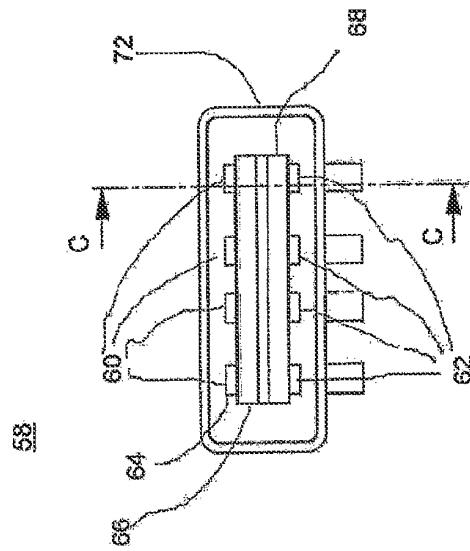
5916



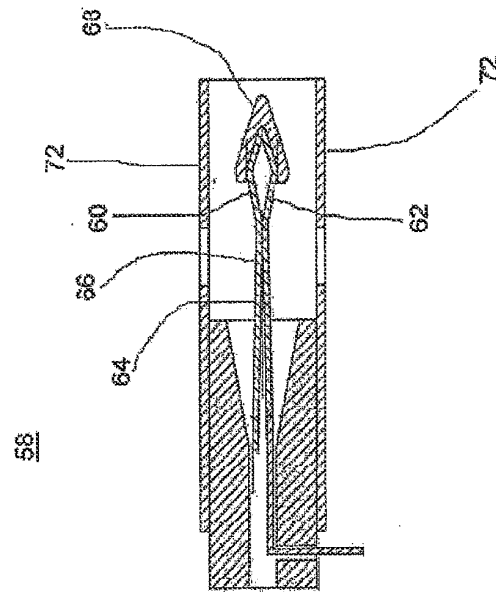
도면 2a



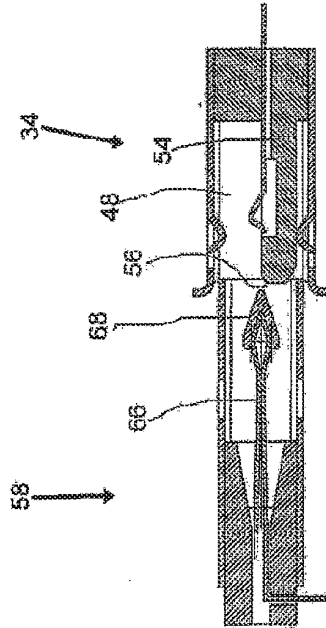
도면 2b



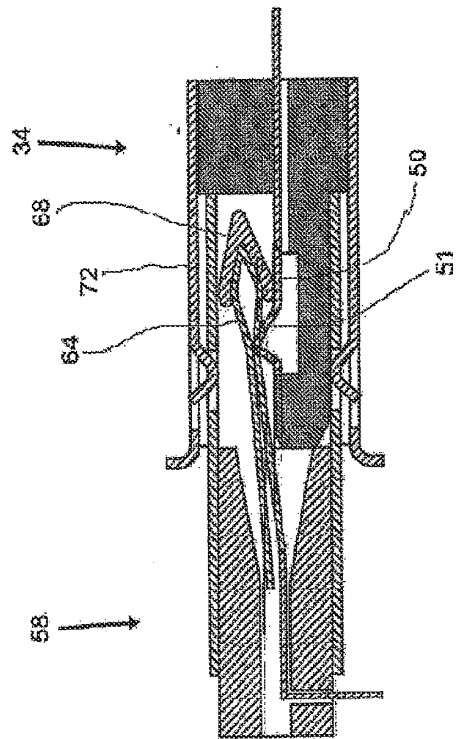
도면 2c



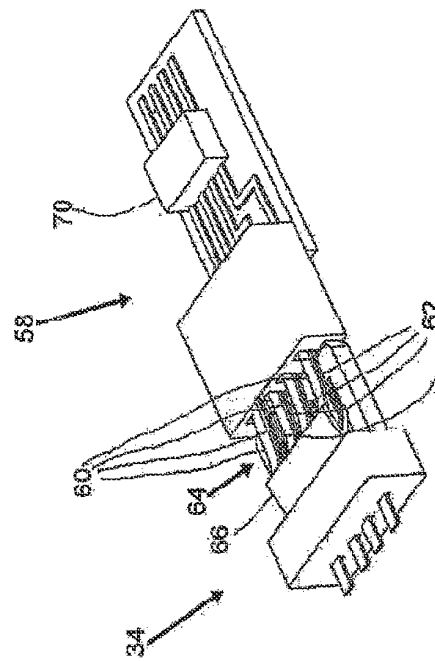
도면2d



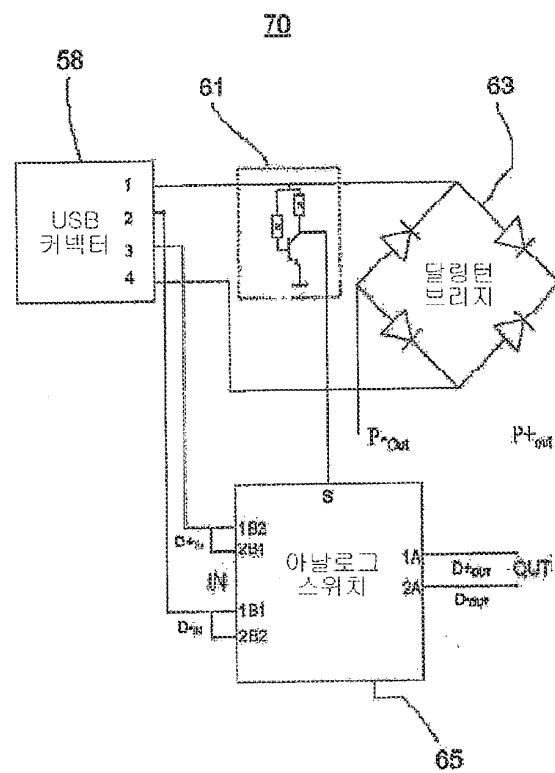
도면2e



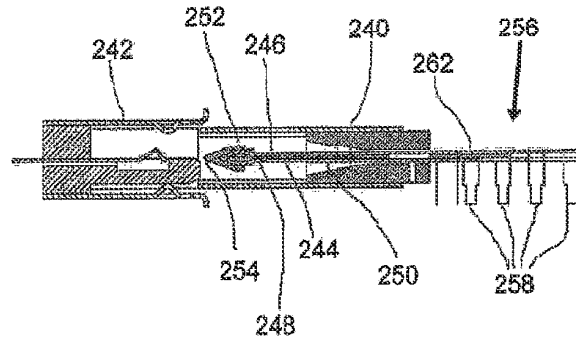
5921



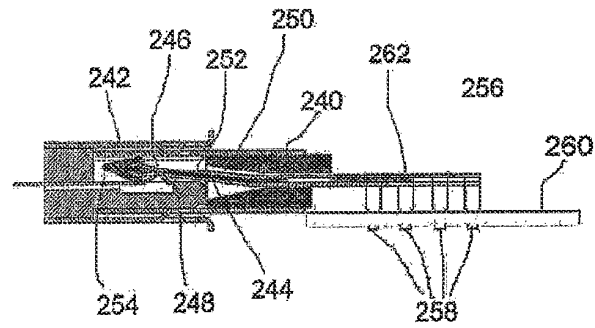
도면 2g



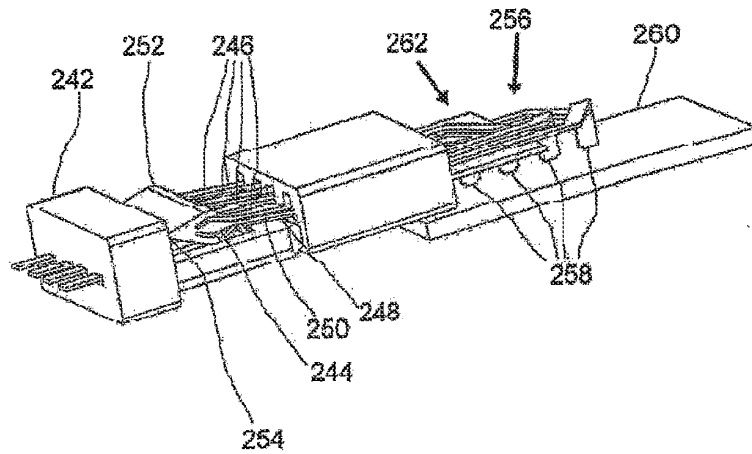
도면2b



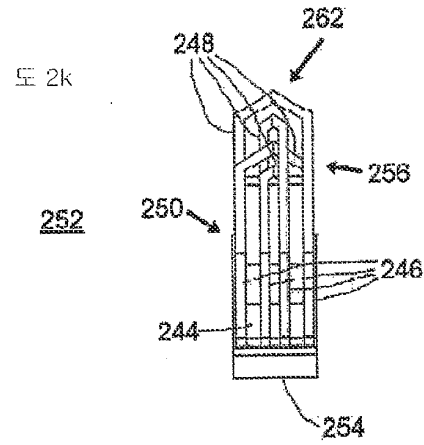
도면2c



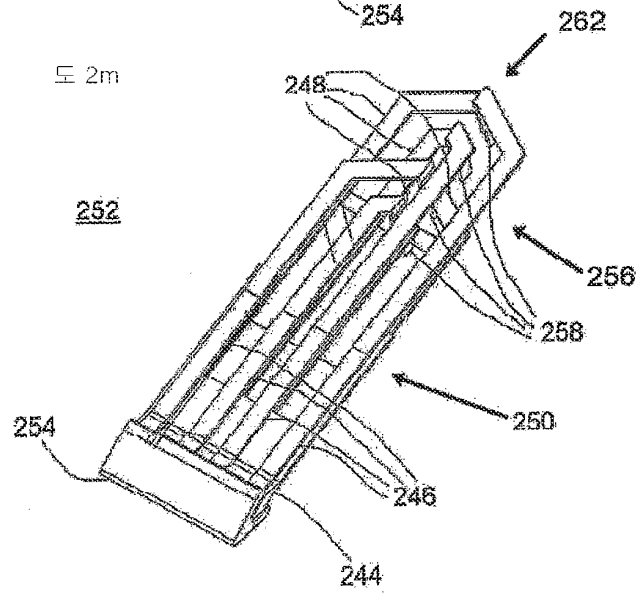
도면2d



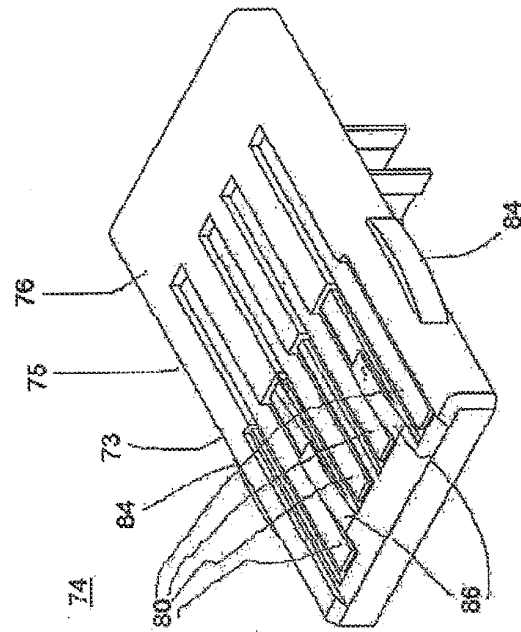
도면 2k2m



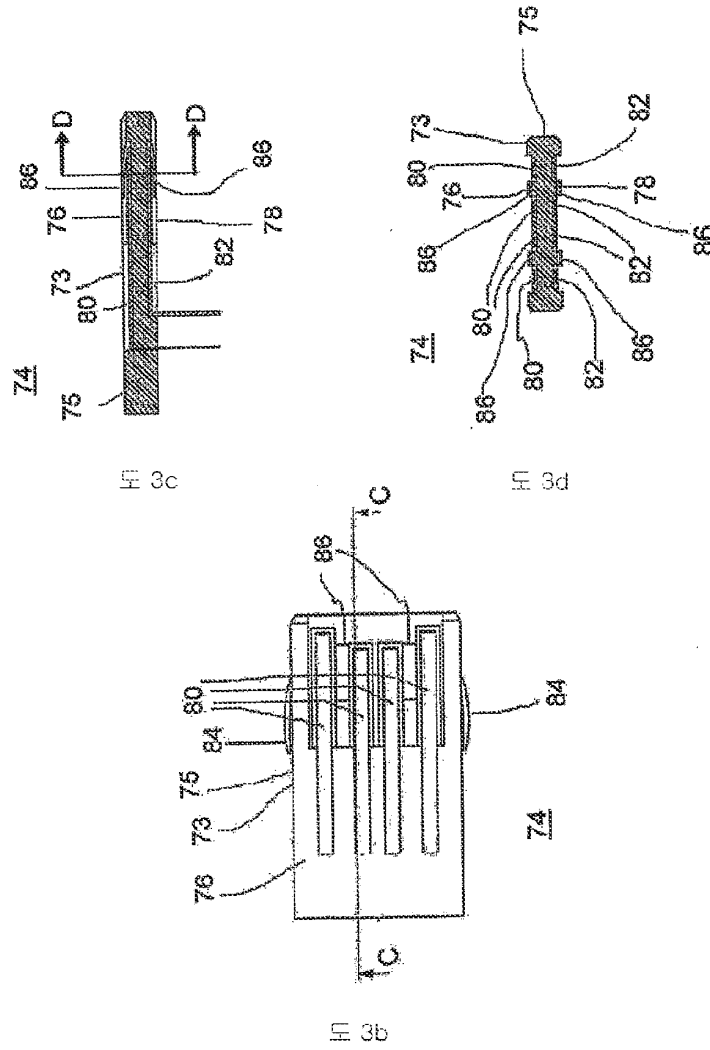
도 2m



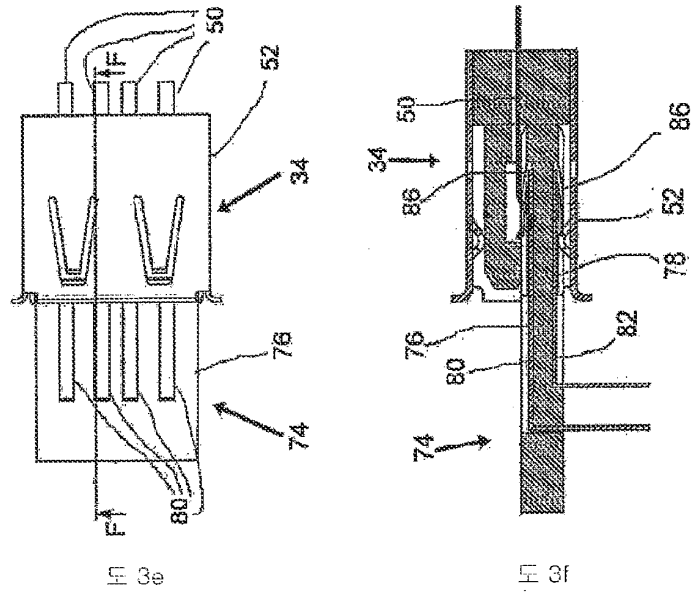
도면 3a



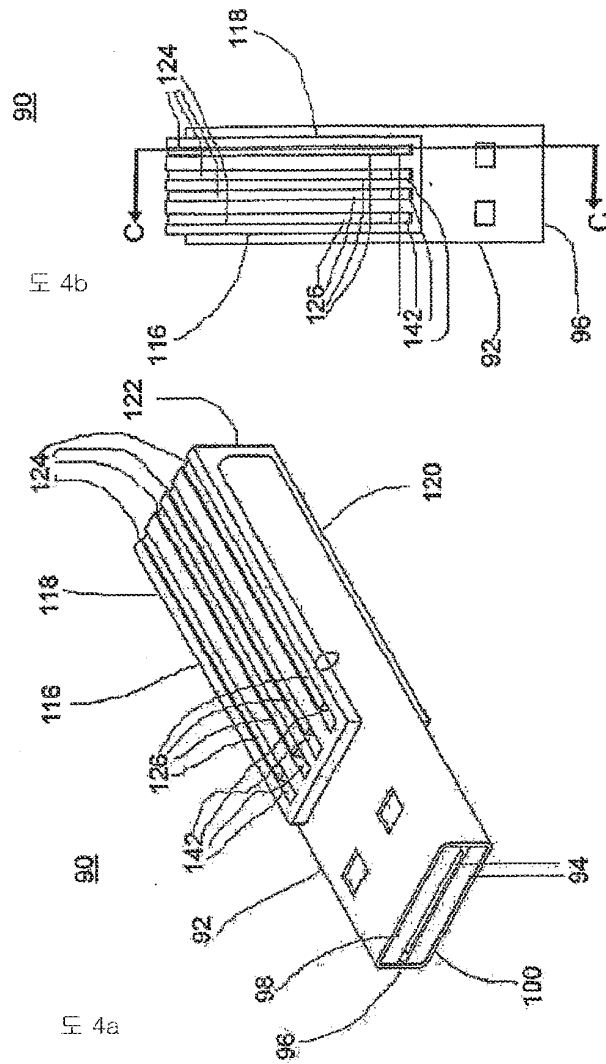
도면3b3c3d



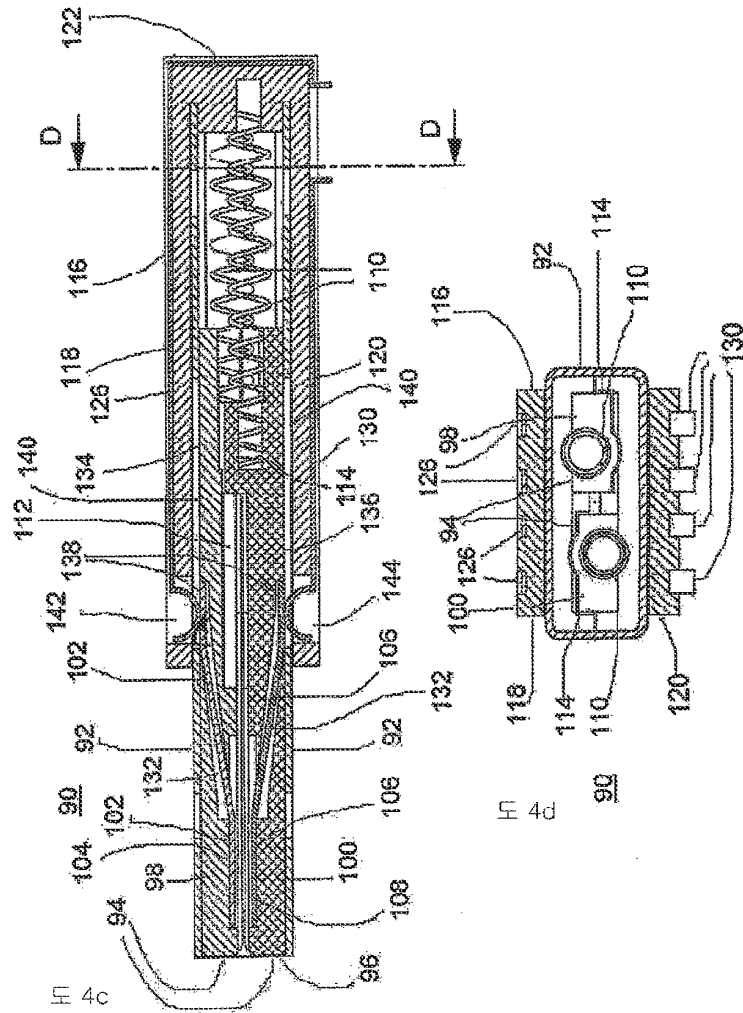
도면3e3f



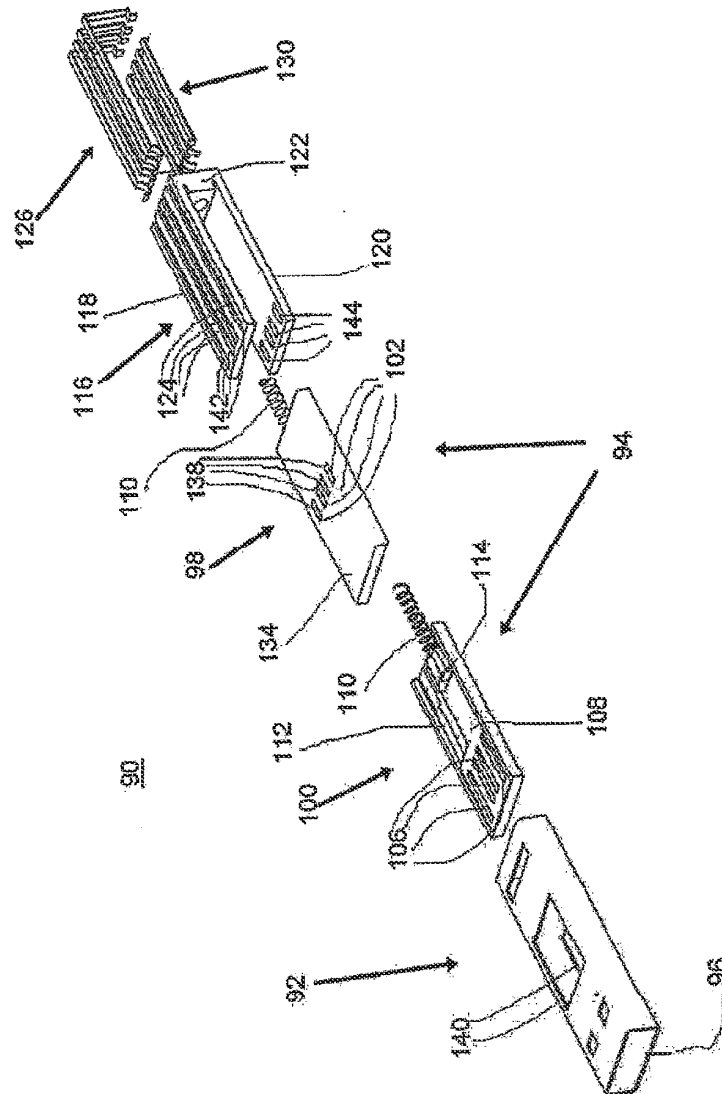
도면4a4b



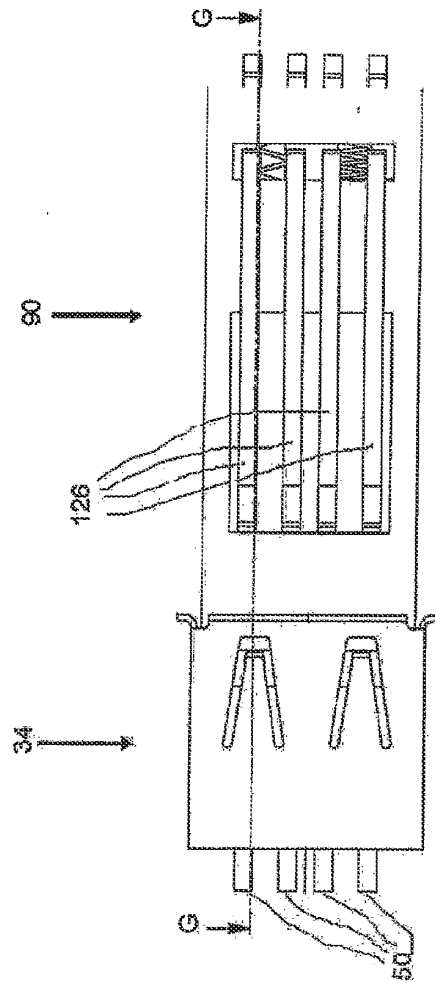
도면4c4d



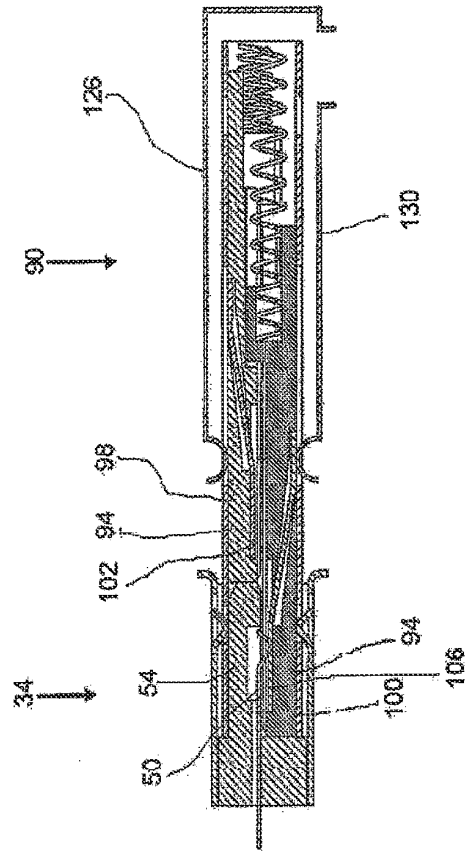
도면4e



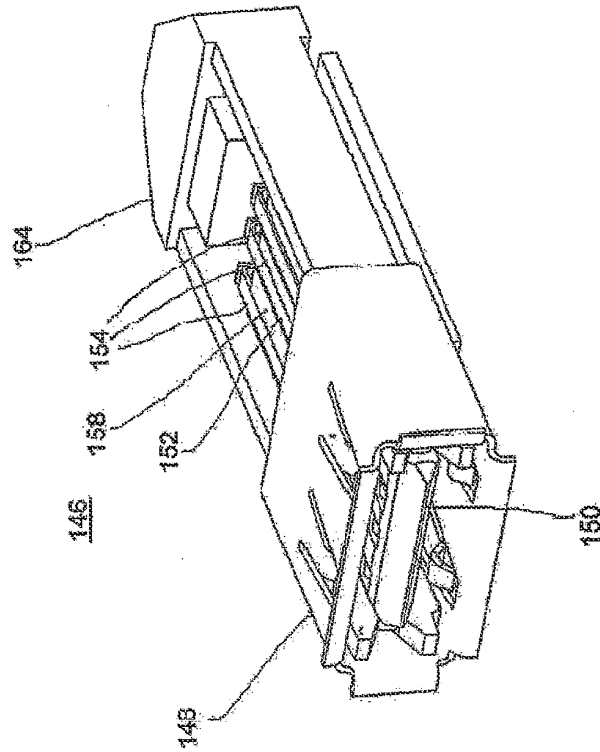
도면 4f



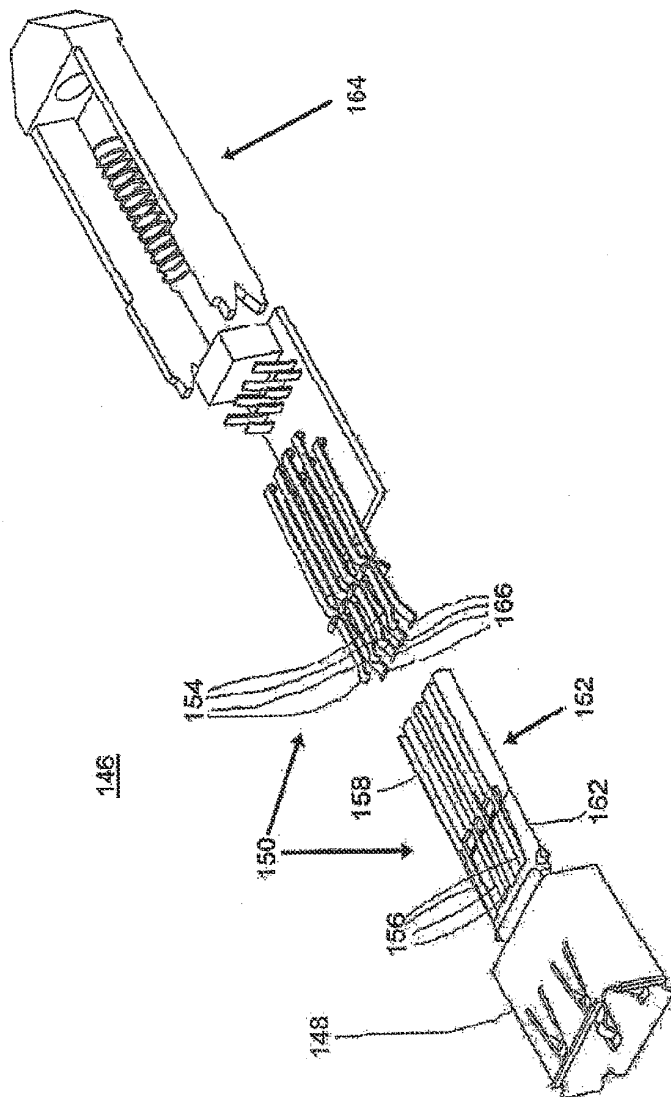
도면4g



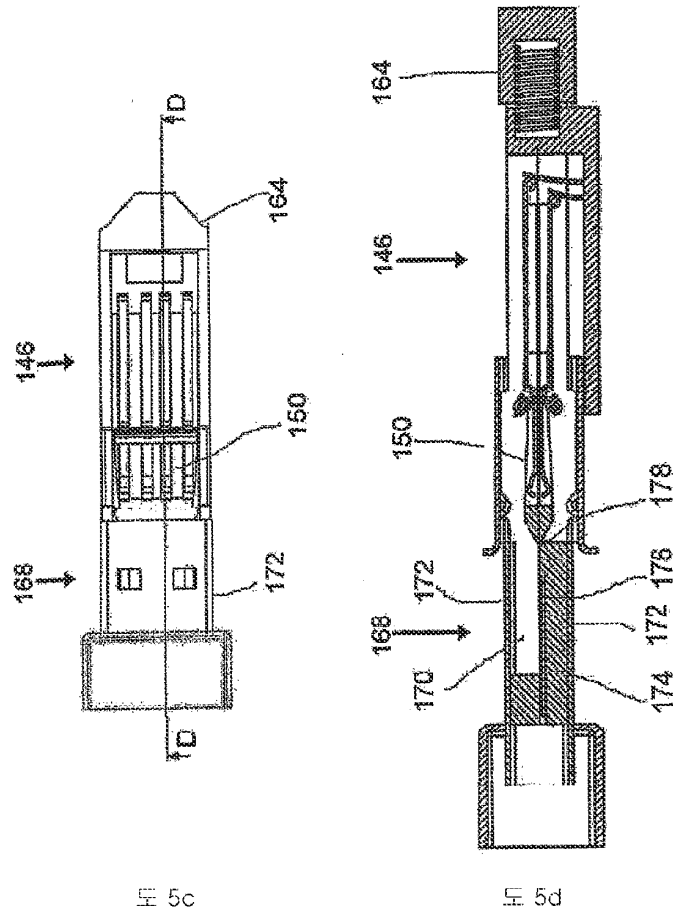
도면 5a



도면5b



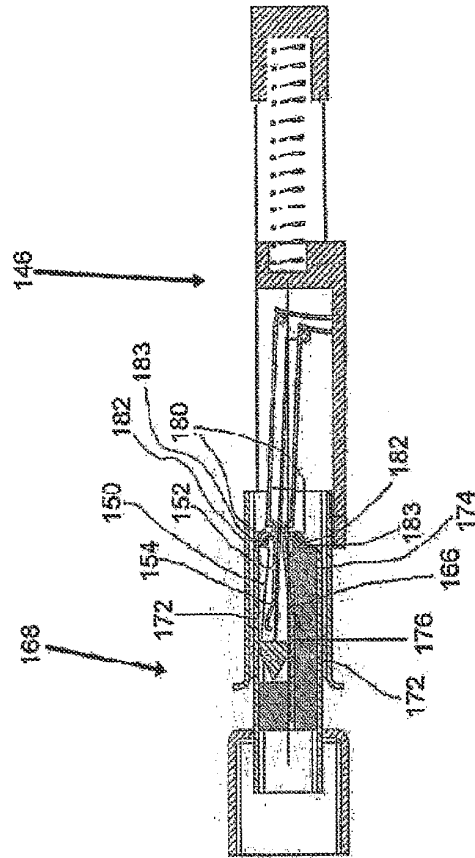
도면5c5d



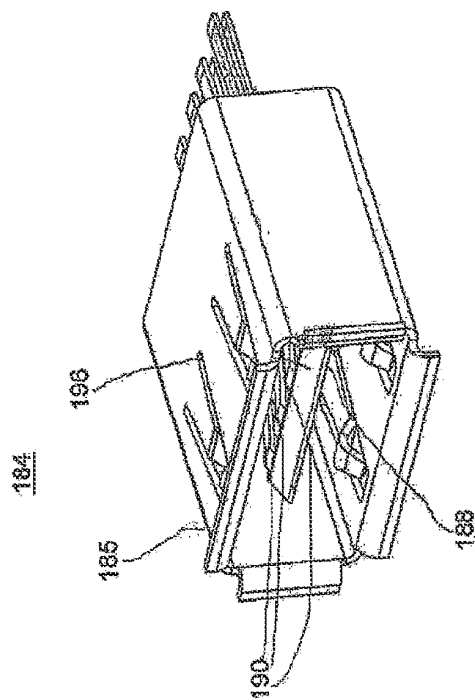
도 5c

도 5d

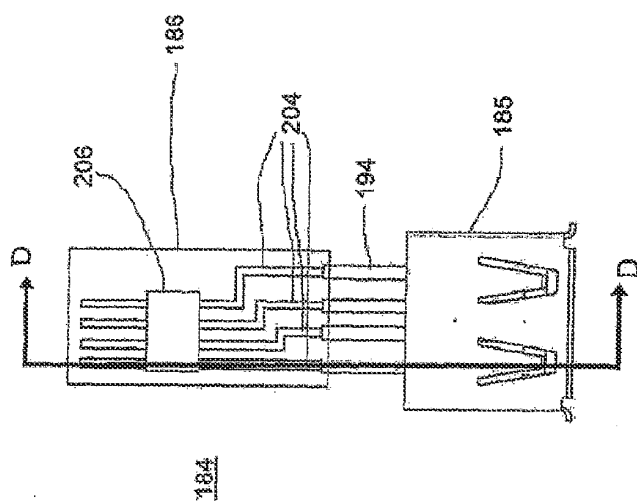
도면5e



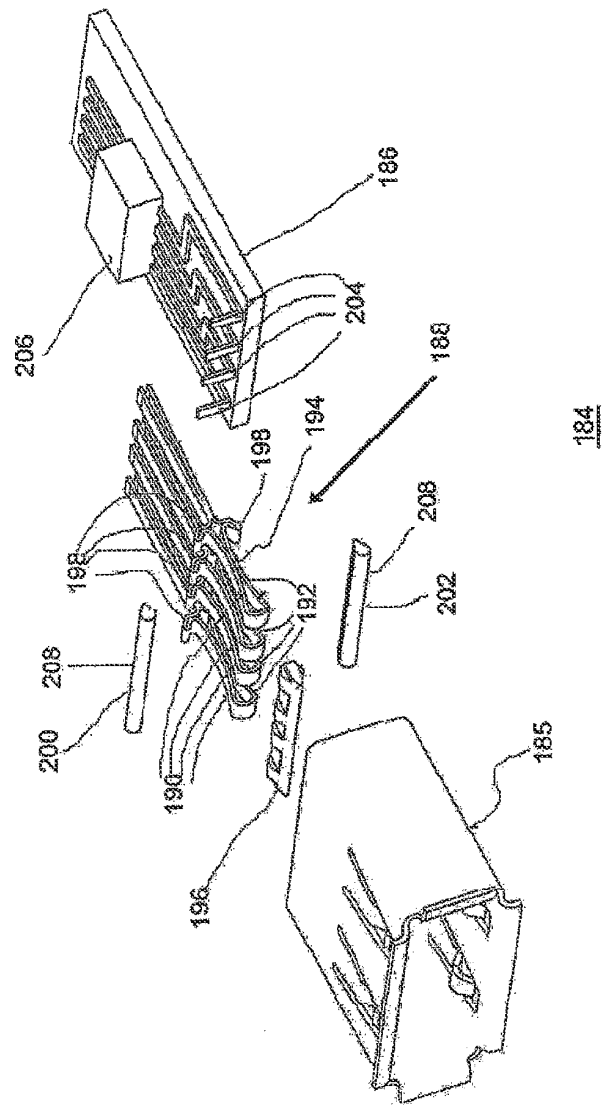
도면6a



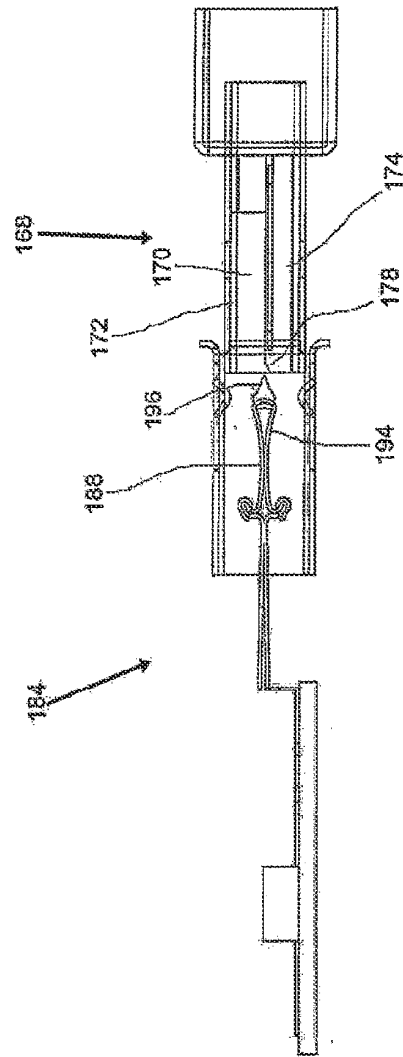
도면6b



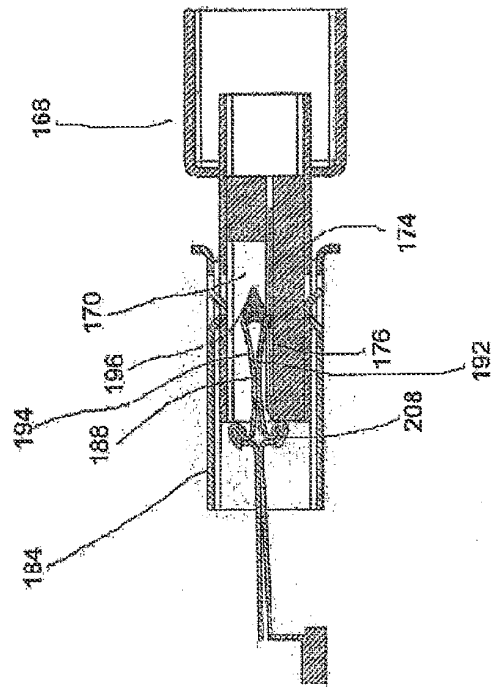
도면6c



도면6d

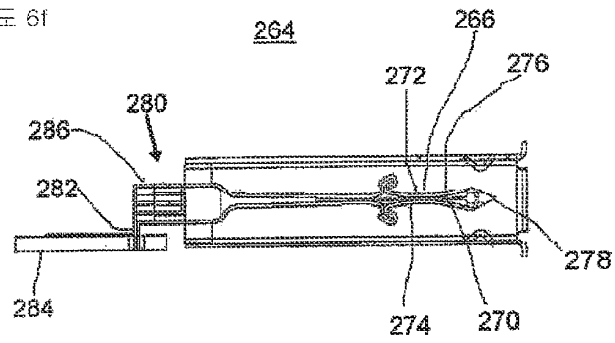


LE 66

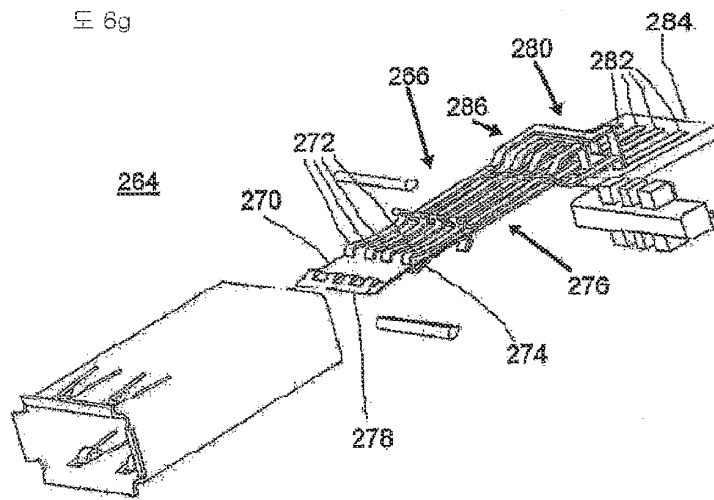


도면 6f6g

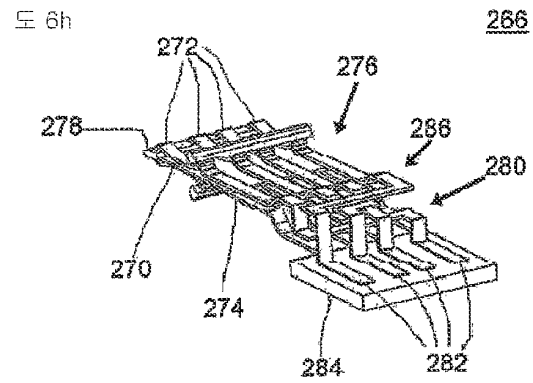
도 6f



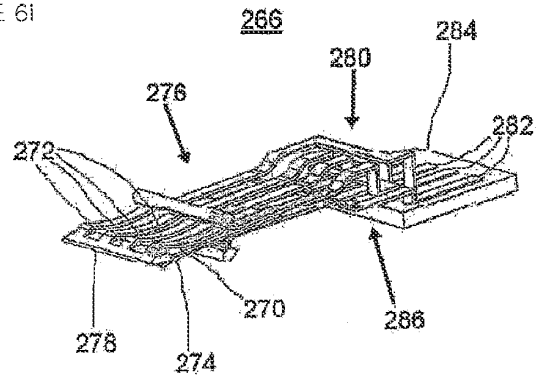
도 6g



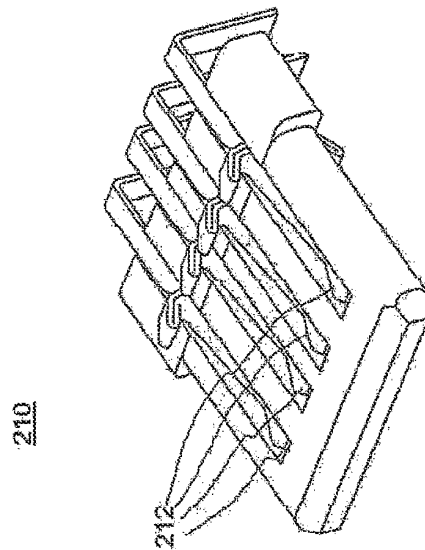
도면6b6i



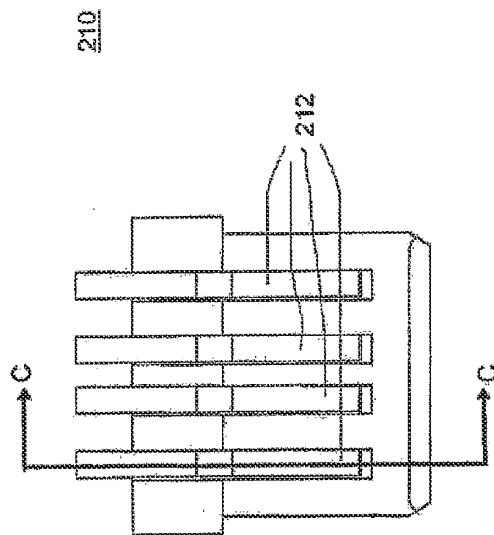
도 6i



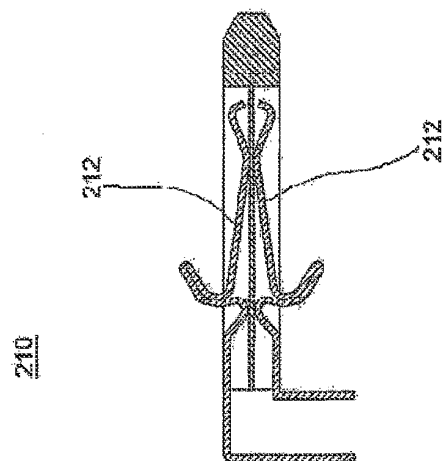
도면7a



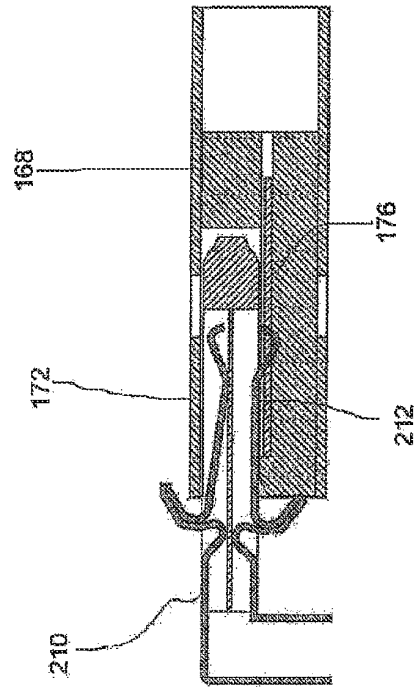
도면7b



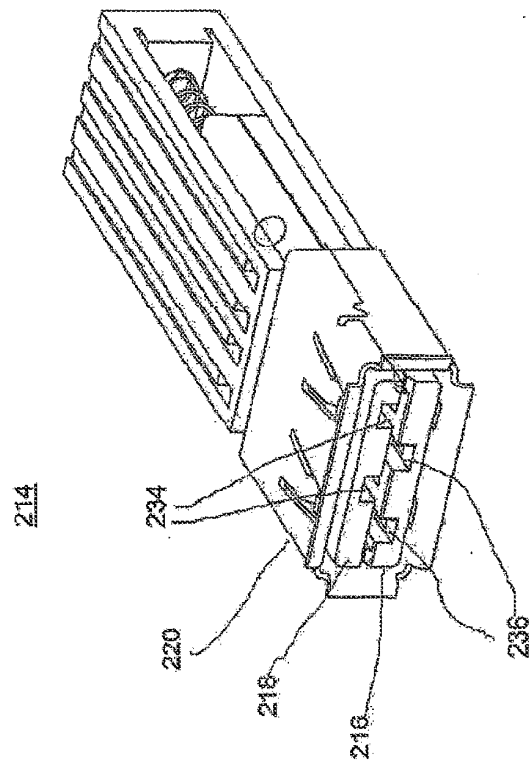
도면7c



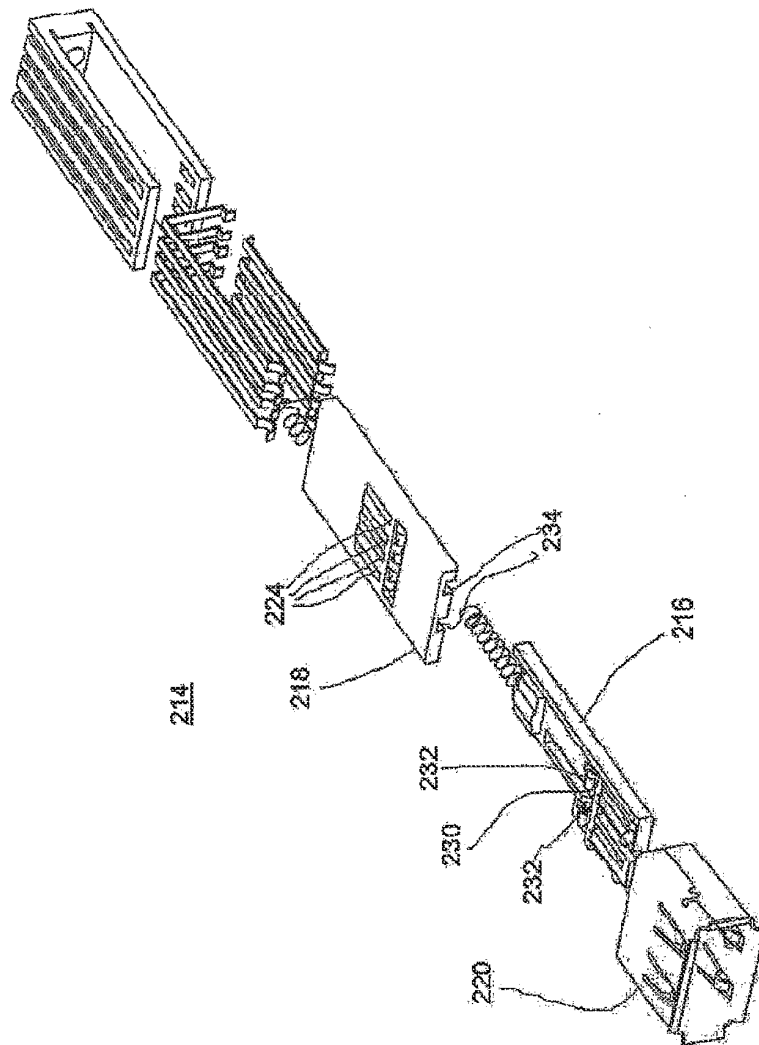
도면7d



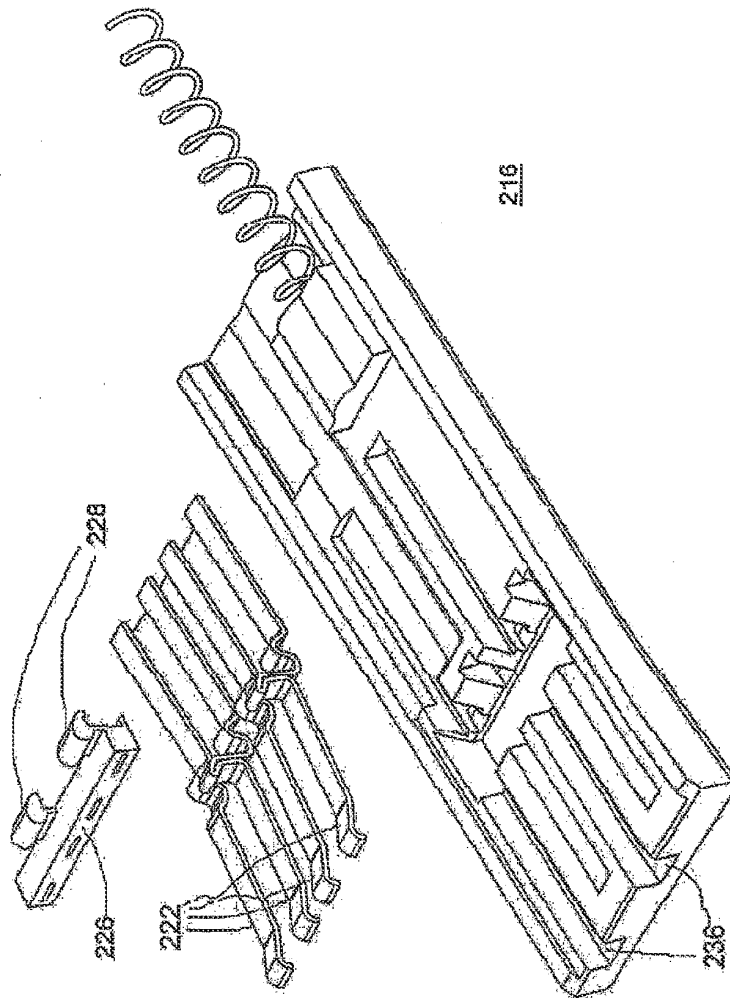
도면8a



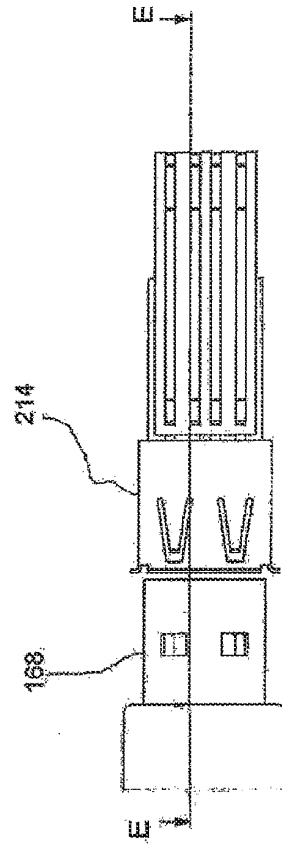
도면8b



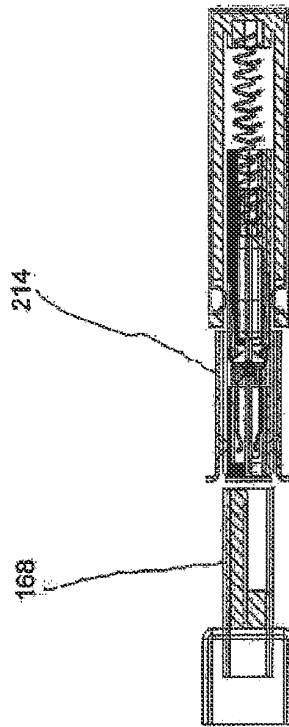
도면8c



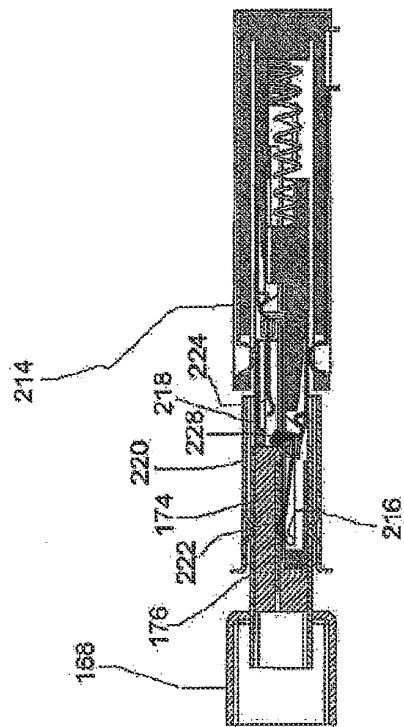
도면 8d



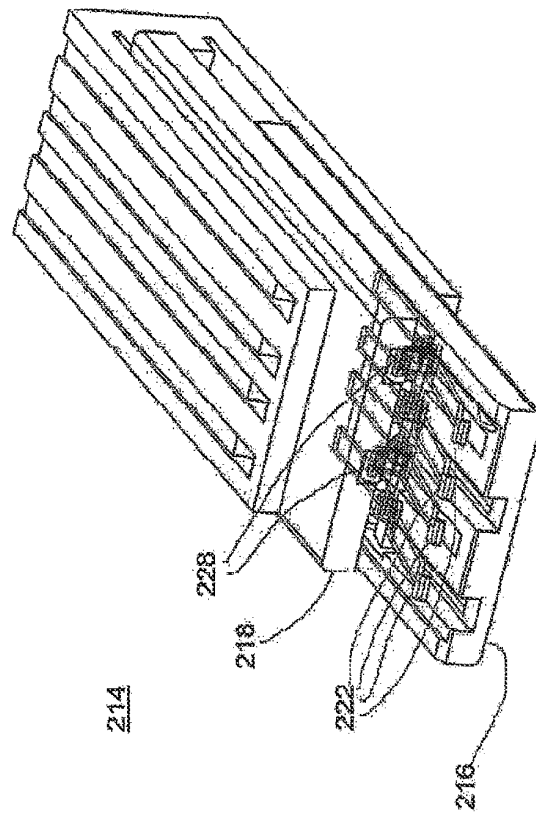
도면8e



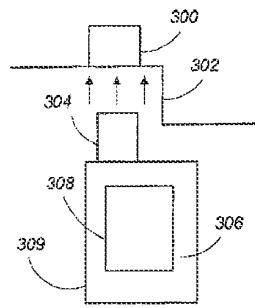
도면8f



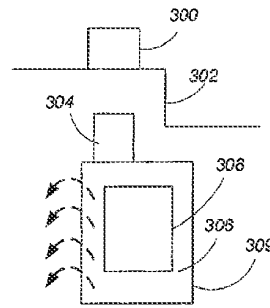
도면 8g



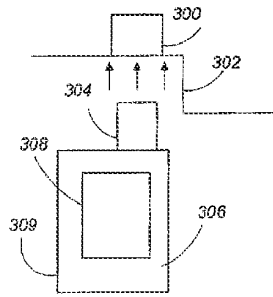
도면9a9b9c9d



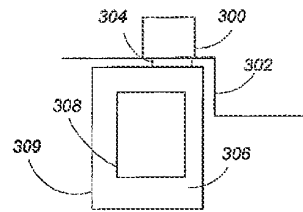
도 9a



도 9b

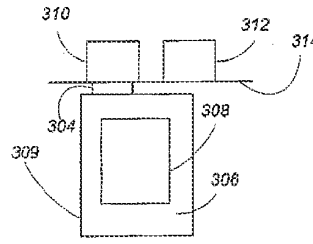


도 9c

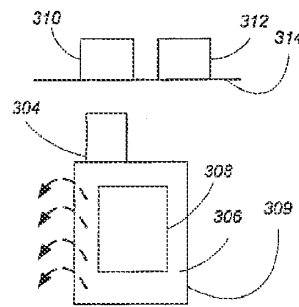


도 9d

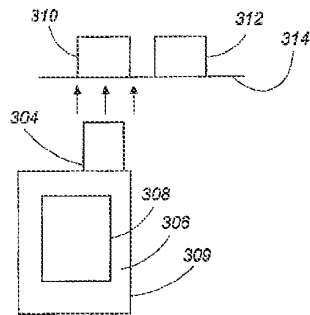
도면9e9f9g9h



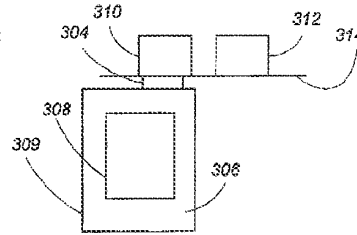
도 9e



도 9f

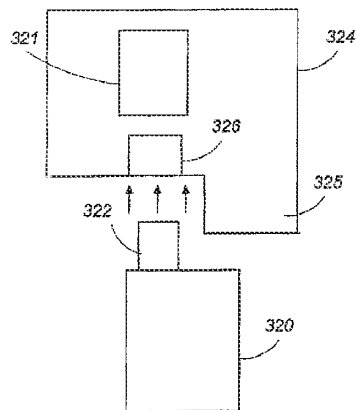


도 9g



도 9h

도면10



(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
10 February 2005 (10.02.2005)

PCT

(10) International Publication Number
WO 2005/013436 A1

(51) International Patent Classification⁷: **H01R 24/00**,
12/18, H05K 1/11

(74) Agent: **COURTNEY, Mark E.**; Slater & Matsil, L.L.P.,
17950 Preston Rd., Suite 1000, Dallas, TX 75252 (US).

(21) International Application Number:
PCT/US2004/024167

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(22) International Filing Date: 26 July 2004 (26.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/490,413 28 July 2003 (28.07.2003) US

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (for all designated States except US): **MDRM
INC.** [US/US]; c/o PHS Corporate Services Inc, 1313 N.
Market Street, Suite 5100, Wilmington, DE 19801 (US).

(72) Inventors; and

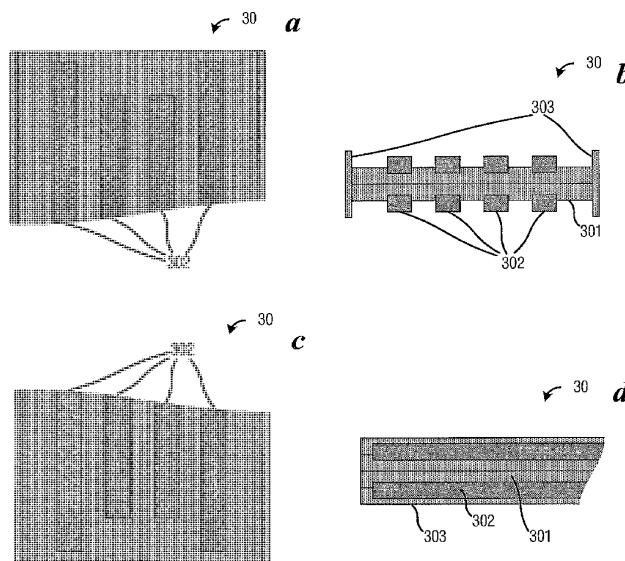
(75) Inventors/Applicants (for US only): **HARKABI,
Dan** [IL/IL]; Meshek 17, 79360 Moshav Lachish (IL).
ELAZAR, Gidon [IL/IL]; Netafim 2, 44862 Tsur-Yigal
(IL). **WEINGARTEN, Nehemiah** [IL/IL]; Drezner 8,
69497 Tel-Aviv (IL).

Published:

— with international search report

[Continued on next page]

(54) Title: ELECTRICAL CONNECTOR



(57) Abstract: An electrical connector (30), for example a connector that will operate with the Universal Serial Bus, is disclosed. In some embodiments, the connector (30) includes none, one, or several tongue board (301), tongue tip, electrical contact (302), housing shell, insulating strip on the inner lining of housing shell, protective edge (303). A connector integral to a printed circuit board is also disclosed. Other embodiments are disclosed.

WO 2005/013436 A1



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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.

ELECTRICAL CONNECTOR

This application claims the benefit of U.S. Provisional Application No. 60/490,413, filed on July 28, 2003, entitled Electrical Connector, which application is hereby incorporated herein by reference.

TECHNICAL FIELD

5 The present invention relates to an electrical connector, and more particularly to a Universal Serial Bus (USB) connector.

BACKGROUND

In many situations, computers are connected to peripherals or electronic appliances using wire connections. One type of wire connection is the Universal Serial Bus (hereafter USB) cable. A USB cable may be used to electrically connect a computer with peripherals and other electronic appliances. Examples of computer peripherals are input devices such as a mouse and a keyboard, output devices such as printers, and input/output devices such as external hard drives and flash memory drives. Examples of electronic appliances are digital cameras, PDAs, and MP3 players.

In the late 1990's the USB standard became the preferred connection interface in the computer industry and has become ubiquitous in almost all computers manufactured today. Laptop computers, desktop computers, and other computing machines are manufactured with USB ports in order to take advantage of the variety of peripheral devices and electronic appliances that are built around USB architecture. (See www.USB.org)

The Universal Serial Bus and USB connectors are well known in the art. The pervasiveness of the USB standard and USB connectors has increased utility to consumers, substantially increased data transfer rates over other interface methods and reduced costs for manufacturers of peripheral devices due to standardization. Computer vendors typically incorporate one or more USB ports into their suite of Input Output ports.

A USB cable used to connect peripherals or electronic appliances to a computer is comprised of 2 endpoints known as connectors or plugs. One connector, known as Series "A" plug, is attached to the host computer and the other, known as Series "B" plug, is attached to the connecting appliance. Series "A" and Series "B" plugs are of different shape and size so as not to confuse between them. The interface connection on the host computer is called USB mount port (hereafter USB port). The USB port is comprised of a Series "A" receptacle that mates with a Series "A" plug. Electrically, Series "A" receptacles function as outputs from host systems. Figure 1 shows a prior art Series "A" plug 10, which mates with a Series "A" receptacle 12. The Series "A" plug always is oriented towards the host system. Photographs of the plug and connector are shown in the provisional application Serial No. 60/490,413, filed 7/28/2003, entitled "Electrical Connector" (hereinafter "the provisional application") which is incorporated herein by reference.

The computer host USB port is an open receptacle with a flat, internal rectangular card bearing electrical contact points. The cable series "A" plug connecting to the host receptacle terminates in a rectangular sleeve that is inserted into the host receptacle. The sleeve contains a tongue board bearing matching electrical contact points to those of the host receptacle. The insertion of sleeve to the receptacle affixes the card and tongue thus creating a mated electrical connection.

Some peripheral devices do not employ a USB cable to connect to a computer but rather utilize a USB connector as part of their assembly. Examples are keychain storage devices (see www.diskonkey.com, www.thumbdrive.com) or security keys (see www.ealaddin.com). The provisional application shows an example of

a USB drive plugged into a host PC USB port. Keychain storage devices, due to their small dimensions, serve as portable storage media, and as such are often used with several computers. Therefore, these devices are plugged in and out of host computers many times.

There is unfortunately a shortcoming in the physical design of the USB connector, which manifests itself when a attempting to insert a USB connector into a USB port. Referring again to Figure 1, it can be seen that while seeming symmetric to touch and sight externally, both the receptacle 12 and the plug 10 are asymmetric internally. In the host receptacle, this is due to the positioning of the rectangular card 101 and electrical connectors 102 inside the receptacle. Figures 2a-2c show an example of a USB host receptacle 100. Figure 2 depicts three views of a USB receptacle of the prior art. In particular, Figure 2a shows a front section, Figure 2b shows a side view section, and Figure 2c shows a bottom side view section. Referring to these figures, a rectangular card 101 is located within the receptacle 100. Electric contact points 102 are formed on the card 101.

Figures 3a-3c depict an example of a Series "A" USB plug of the prior art. In particular, Figure 3a depicts a top view section, Figure 3b depicts a front view section, and Figure 3c depicts a side view section. The prior art plug connector includes a shell 200. A tongue board 201 is located within the shell and electric contact points 202 are formed on the tongue board. Similarly, inside the USB connector shell 200, the tongue 201 and electrical contacts 202 are positioned in a non-symmetric manner.

In many cases, the host USB port is located at an angle in which users can't comfortably see the inside of the receptacle, and it is unclear to the user how to align the plug for proper insertion and electrical mating. Figures 4 and 5 depict mating a USB plug and a USB receptacle of the prior art. The rectangular sleeve of a USB plug fits correctly into the rectangular receptacle 100 of the USB port only when the internal rectangular card 101 of the receptacle and the internal tongue board 201 of the USB plug are correctly facing each other as shown in Figure 4. Figure 5 illustrates the case when the plug is correctly inserted into the receptacle. When this is not the case, an electric mating is not possible as the internal rectangular card 101 of the receptacle and the internal tongue board 201 of the USB connector collide as shown in Figures 6a and 6b, also prior art. Figure 6a shows a view similar to that of Figure 5 except that the receptacle 100 and shell 200 are not properly aligned. Figure 6b shows the collision 205 that results from this misalignment.

In some cases, users may not see the internal alignment in the host USB receptacle because it is positioned in the back or on the side of the computer. Statistically, since there are seemingly two alignment possibilities when connecting the rectangular plug to the rectangular receptacle, but only one correct alignment, there is a 50% chance of failed insertion attempts. The result is a degradation of the user experience in working with USB devices. As more devices connect to computers using USB connectors, this problem intensifies. For keychain storage devices that are plugged many times in and out of many computers, this inconvenience intensifies.

There is clearly an unmet need for a plug mechanism that is operable with the USB that allows correct insertion of the plug into a USB port without necessitating user consideration of plug alignment.

SUMMARY

In one aspect, the present invention provides a solution to the problem stated above and describes improvements of the USB plug. In one exemplary embodiment (hereafter SLIM embodiment), the connector tongue board is not housed in a shell. The tongue board, which has two sets of contact points, one on each side of the tongue board, may be correctly inserted into host receptacle in two alignments. Since the contact points are present on both sides of the tongue board, any alignment will provide proper electrical mating.

In another exemplary embodiment of the invention (hereafter FLEX embodiment), the solution is achieved by using a flexible tongue board that can position itself according to the computer receptacle's rectangular card position, thus achieving electrical mating in every insertion. Here too, exist two sets of contact points, one on each side of the flexible tongue board.

In order to reduce manufacturing and assembly costs, yet another exemplary embodiment is presented in which the novel connector which is operable with the USB receptacle is part of the Printed Circuit Board (PCB) of the peripheral device.

The foregoing has outlined rather broadly the features and technical advantages of embodiments of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of embodiments of the invention will be described hereinafter, which form the subject of the claims of the invention. It should be appreciated by those skilled in the art that the conception and specific embodiments disclosed may be readily utilized as a basis for modifying or designing other structures or processes for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims and that such equivalent constructions fall within the scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying drawings, in which:

- Figure 1 depicts a series "A" USB plug on a USB cable and a series "A" USB receptacle of the prior art;
- 5 Figures 2a-2c depict various views of a prior art USB receptacle;
- Figures 3a-3c depict various views of a prior art USB plug;
- Figure 4 depicts the proper alignment of a prior art USB plug inserted into a host USB receptacle;
- Figure 5 depicts the combination of a properly inserted USB plug and a USB receptacle of the prior art mated in correct alignment;
- 10 Figures 6a-6b illustrate an improper attempt to insert a USB plug of the prior art into a host USB receptacle;
- Figure 7 is a schematic diagram of an exemplary SLIM embodiment of the present invention, in 4 views 7a-7d;
- Figure 8 is a schematic diagram of an exemplary SLIM embodiment of the present invention in a side view, including the layout of the electrical contact points of present embodiment of the invention;
- 15 Figures 9a-b illustrate the insertion of an exemplary SLIM embodiment of the present invention into a host USB port;
- Figure 10 is a schematic diagram of an exemplary FLEX embodiment of the present invention, in 3 views 10a-10c;
- 20 Figure 11 is a schematic diagram of an exemplary FLEX embodiment of the present invention in a side view, including layout of the electrical contact points of the present embodiment of the invention;
- Figures 12a-c illustrate the insertion of an exemplary FLEX embodiment of the present invention into a host USB port;
- Figures 13a-c are another illustration of the insertion of a FLEX embodiment of the present invention into a host USB port; and
- 25 Figures 14a-b are schematic diagrams of another embodiment of the present invention, in which the USB connector of the invention is an integral part of the peripheral device PCB.
- Corresponding numerals and symbols in the different figures generally refer to corresponding parts unless otherwise indicated. The figures are drawn to clearly illustrate the relevant aspects of the preferred embodiments and are not necessarily drawn to scale.
- 30

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

The making and using of the presently preferred embodiments are discussed in detail below. It should be appreciated, however, that the present invention provides many applicable inventive concepts that can be embodied in a wide variety of specific contexts. The specific embodiments discussed are merely illustrative of specific ways to make and use the invention, and do not limit the scope of the invention.

In the following detailed description of exemplary embodiments of the invention, reference is made to the drawings that illustrate specific exemplary embodiments in which the invention may be practiced. Those skilled in the art will appreciate that other embodiments may be utilized without departing from the spirit of the present invention; therefore the following detailed description of the invention should not be taken in a limiting sense.

The preferred embodiment of the present invention is an improvement of existing USB series "A" plugs. This improvement is achieved by providing electrical contact points on both sides of connector tongue board, thus facilitating the insertion of the improved plug connector for devices operable with the USB into USB host computers.

Figure 7, which includes the top view of Figure 7a, the front view of Figure 7b, the bottom view of Figure 7c, and the top side view of Figure 7d, depicts electrical plug 30 in accordance with one embodiment of the present invention (SLIM embodiment). The plug 30 includes a tongue 301, a plurality of contacts 302 on both sides of tongue 301, and protective edges 303. The tongue 301 may be the endpoint of a USB cable, or an integral part of a peripheral device, such as a keychain storage device.

Figures 9a and 9b depict an attempt to connect plug 30 to a USB receptacle 100. The physical structure of plug 30 is symmetric on the lateral axis. When the tongue 301 encounters USB receptacle 100, tongue 301 takes up the free space available in receptacle 100, and creates an electric connection.

Electrical contacts 302 are present on both sides of tongue 301. This ensures that insertion of tongue 301 into receptacle 100 in either of two possible alignments will produce proper electrical mating. In order to assure that each of electrical contact points 302 are mated with the correct electrical contact points 102 in USB port 1, regardless of original alignment of tongue 301, the electrical contact points on each side of tongue 301 are oppositely aligned, as shown in Figure 8.

In Figure 8, the electric contact points 302 are each labeled with a number 1, 2, 3, or 4. In the preferred embodiment, the contact points carry electrical signals as defined by Table 1.

TABLE 1

<u>Contact Point</u>	<u>Signal Line</u>
1	GND
2	Signal A
3	Signal B
4	VCC

In some instances, USB receptacle 100 may serve as common electrical ground. In order to avoid short-circuiting the electrical contact points 302 on the opposite side of tongue 301 that are not participating in the electrical mating, protective edges 303 are used. The protective edges 303 protrude from tongue 301 a little more than the electrical contacts 302 do, and thus prevent physical connection to housing 100 that might otherwise cause a short circuit.

Figures 10a (top view), 10b (front view), and 10c (side view) show an electrical plug 40 in accordance with another embodiment of the present invention (FLEX embodiment). The plug 40 includes a shell 400, a flexible

tongue 401, a tongue tip 402, a plurality of contacts 403 on both sides of flexible tongue 401, and insulating strips 404. The flexible tongue 401 is positioned inside shell 400, in the center of the lateral axis of shell 400.

Figures 12a-12c depict an attempt to connect plug 40 to a USB receptacle 100. Figure 12a shows the plug 40 before mating. Figure 12b shows alignment of the flexible tongue 401 upon encountering the rectangular card 101. Figure 12c shows the plug after it has been mated. Figures 13a-13c are similar views illustrating the same operation, except that the tongue 401 flexes in the opposite direction. The structure of plug 40 is symmetric on the lateral axis, as the tongue board is located in the middle of the shell 400. When the shell 400 encounters receptacle 100, tongue tip 402 faces rectangular card 101 and helps to divert flexible tongue 401 and avoid a collision of rectangular card 101 and flexible tongue 401. As insertion of shell 400 into receptacle 100 continues, flexible tongue 401 takes up the free space available in receptacle 100, and creates an electric connection.

Electrical contacts 403 are present on both sides of flexible tongue 301 in order to assure not only insertion of plug 40 into USB receptacle 100 but proper electrical mating whether flexible tongue has to move down as shown in Figure 12 or up as shown in Figure 13.

In some USB connectors, shell 400 may serve as common electrical ground. In order to avoid short-circuiting the electrical contact points 403 not participating in the electrical mating, insulation strips 404 are lined inside shell 400.

In order to ensure that each electrical contact point 402 is mated with the correct electrical contact point 102 in USB port 1, regardless of original alignment of flexible tongue 401, the electrical contact points on each side of flexible tongue 301 are oppositely aligned, as shown in Figure 11. The signals/ supply voltages corresponding to the contact points are shown in Table 1.

Figures 14a and 14b show an example of a SLIM embodiment in which the present invention is used to connect a peripheral device 50 to a USB host computer (not shown) without the use of a cable. The electrical plug 30 is an integral part of the printed circuit board (PCB) 500. Internal electronics 501 are connected to top electric contact points 302 by using internal electronic contacts 502. In the top view of Figure 14a, top internal electric contacts 502 are directly connected to top electric contact points 302. In the bottom view of Figure 14b, electrical plug 30 must maintain same order and positioning of bottom electric contact points 304 relative to top electric contact points 302. Internal electronics 501, however, are the same chip (*e.g.*, piece of silicon) both top and bottom. Therefore, bottom internal electric contacts 504 must be crossed to match bottom electric contact points 304. By reducing the number of parts needed to assemble peripheral device 50, lower manufacturing costs are achieved.

Although embodiments of the present invention and their advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the invention as defined by the appended claims. For example, it will be readily understood by those skilled in the art that many of the features, functions, processes, and materials described herein may be varied while remaining within the scope of the present invention. Moreover, the scope of the present application is not intended to be limited to the particular embodiments of the process, machine, manufacture, composition of matter, means, methods and steps described in the specification. As one of ordinary skill in the art will readily appreciate from the disclosure of the present invention, processes, machines, manufacture, compositions of matter, means, methods, or steps, presently existing or later to be developed, that perform substantially the same function or achieve substantially the same result as the corresponding embodiments described herein may be utilized according to the present invention. Accordingly, the appended claims are intended to include within their scope such processes, machines, manufacture, compositions of matter, means, methods, or steps.

WHAT IS CLAIMED IS:

1. An electrical connector, comprising:
a tongue;
a first set of one or more electrical contacts located on a first side of the tongue and extending along its
5 length; and
a second set of one or more electrical contacts located on a second side of the tongue and extending along
its length, each of said second set of electrical contacts associated with a respective one of the first set of electrical
contacts and being positioned in reverse symmetry with the first set of contacts;
whereby the electrical connector will electrically and physically mate to a corresponding receptacle when
10 inserted into the receptacle, irrespective of which side of the electrical connector is the top surface.
2. The electrical connector of Claim 1, and further comprising:
side protectors in association with each side of the tongue for preventing the electrical contacts from
physically contacting the housing of the receptacle.
3. The electrical connector of Claim 2 wherein the first and second set of electrical contacts are configured for
15 conducting the data signals and ground and supply voltages which comply with the universal serial bus (USB)
standard.
4. The electrical connector of Claim 2 wherein the electrical connector mates with a USB standard "A type"
compliant receptacle.
5. A connector for connecting to a receptacle which complies with the USB standard interface, comprising:
20 an extension member carrying electrical contacts comprising a first set of electrical contacts on one side
and a second set of electrical contacts on the opposite side, the first set of electrical contacts each carrying a
respective one of the data signals and voltages required for interfacing with a USB standard "A type" compliant
receptacle, each of the second set of electrical contacts being associated with a respective one of the first set of
electrical contacts and being positioned in reverse symmetry with respect to the first set of electrical contacts.
- 25 6. The connector of Claim 5 and further comprising side protectors in association with each side of the
extension member for preventing the electrical contacts from physically contacting the housing of a receptacle.
7. The connector of Claim 5, wherein:
the first set of electrical contacts is placed in an order starting from one side of the connector of a ground
voltage, a first signal A, a second signal B, and a positive supply voltage; and
30 the second set of electrical contacts is placed in a reverse order starting from the same side of the connector
of the positive supply voltage, the second signal B, the first signal A, and the ground voltage;
whereby the signals on the top surface of the connector are always in the same order regardless of which
side of the connector is oriented upwards.
8. A dual-sided electrical connector for coupling to a USB compliant receptacle, comprising:
35 support means for supporting electrical contacts for carrying signals;
first contact means for carrying a first set of signals disposed on one side of the support means conducting
the data signals and voltages required to interface with a USB standard compliant receptacle; and
second contact means disposed on an opposite side of said support means and being associated with said
first contact means, said second contact means being positioned in reverse symmetry from said first contact means;
40 whereby the electrical connector will electrically mate to a USB standard compliant receptacle irrespective

of whether the electrical connector is initially oriented in a first possible alignment or a second possible alignment with respect to the USB receptacle.

9. The dual-sided electrical connector of Claim 8, and further comprising:

means for preventing the first and second set of contact means from physically contacting the external
5 housing of a USB receptacle when said dual side connector is inserted into said USB receptacle.

10. The dual-sided electrical connector of Claim 8, and further comprising:

housing means surrounding and spaced apart from said support means;
whereby said support means may be flexible and at least part of which may be displaced towards either side
of said housing means when the connector is inserted into a receptacle.

10 11. The dual-sided electrical connector of Claim 8, wherein:

the first contact means comprises a first set of signals contacts placed in an order starting from one side of
the dual-sided electrical connector of a ground voltage, a first signal A, a second signal B, and a positive supply
voltage; and

15 the second contact means comprises a second set of electrical contacts placed in a reverse order starting
from the same side of the dual-sided electrical connector of the positive supply voltage, the second signal B, the first
signal A, and the ground voltage;

whereby the signals on the top surface of the dual-sided electrical connector are always in the same order
regardless of which side of the connector is oriented upwards.

12. An electrical apparatus for carrying signals to a USB compliant receptacle, comprising:

20 a cable carrying each of the signals required to implement the USB standard;

a connector coupled to said cable,

a first set of electrical contacts located on one side of the connector and extending in parallel along its
length, each of said first set of electrical contacts coupled to one of said signals;

25 a second set of electrical contacts located on an opposite side of the connector and extending in parallel
along its length, each of said second set of electrical contacts coupled to one of said signals and to a respective one
of said first set of electrical contacts;

wherein the electrical connector mates correctly to a USB standard compliant receptacle irrespective of
whether the electrical connector is initially oriented in a first possible alignment or a second possible alignment with
respect to the receptacle.

30 13. A printed circuit board including a dual-sided electrical connector, comprising:

an extension member extending from the printed circuit board;

a first set of electrical contacts located on one side of said extension member;

a second set of electrical contacts located on the opposite side of said extension member, each associated
with a respective one of said first set of electrical contacts;

35 the first and second set of electrical contacts being positioned so that when the connector is inserted into a
USB compliant receptacle, the electrical connector electrically mates to the receptacle irrespective of whether the
electrical connector is initially oriented in a first possible alignment or a second possible alignment with respect to
the receptacle.

40 14. The printed circuit board of claim 13, wherein the first and second sets of electrical contacts carry the data
signals and power required to implement the USB standard.

15. The printed circuit board of Claim 14, and further comprising: storage media located on the printed circuit board; and a storage processor coupled to the storage media.
16. The printed circuit board of Claim 13 wherein the storage processor is coupled to the electrical connector.
17. The printed circuit board of Claim 16, wherein the storage media, electrical connector and storage processor implement a storage device that can interface with a USB host device.
18. The printed circuit board of Claim 17, wherein the storage media, electrical connector and storage processor comprise together a flash storage device.
19. The printed circuit board of Claim 15, wherein the storage media comprise at least one nonvolatile memory integrated circuit.
20. A storage device having an interface for communication using the USB protocol, comprising:
 a printed circuit board comprising an electrical connector;
 a first set of electrical contacts on one surface of the electrical connector, the electrical contacts for carrying at least the signals and power required to implement the USB standard;
 a second set of electrical contacts located on an opposite surface of the electrical connector, each associated with a respective one of the electrical contacts of the first set, the second set of electrical contacts being positioned in a reverse symmetry with respect to the first set of electrical contacts;
 a storage processor associated with the electrical connector; and
 storage media associated with the storage processor;
 whereby the electrical connector will electrically mate to a receptacle that is compliant with the USB standard irrespective of whether the electrical connector is initially oriented in a first possible alignment or a second possible alignment with respect to the receptacle.
21. The storage device of Claim 20, whereby the storage media may be accessed from the electrical connector responsive to operations executed by the storage processor.
22. The storage device of Claim 20, wherein the storage media comprises one or more nonvolatile memory integrated circuits.
23. The storage device of Claim 20, and further comprising:
 side protectors located in association with the sides of the electrical connector for preventing the electrical contacts from physically contacting the housing of a receptacle when the connector is inserted into the receptacle.
24. The storage device of Claim 20, wherein said electrical connector is integral to and extends from the printed circuit board.
25. The storage device of Claim 20, wherein said electrical connector is coupled to said printed circuit board by a cable.
26. The storage device of Claim 20, wherein said electrical connector is a tongue coupled to said printed circuit board.
27. The storage device of Claim 20, wherein:
 the first set of electrical contacts is placed in an order starting from one side of the connector of a ground voltage, a first signal A, a second signal B, and a positive supply voltage; and
 the second set of electrical contacts is placed in a reverse order starting from the same side of the connector of the positive supply voltage, the second signal B, the first signal A, and the ground voltage;
 whereby the signals on the top surface of the connector are always in the same order regardless of which side of the electrical connector is oriented upwards.

28. An electrical connector, comprising:
a tongue flexible along its length;
a first set of one or more electrical contacts located on a first side of the tongue and extending along its length; and
5 a second set of one or more electrical contacts located on a second side of the tongue and extending along its length, each of said second set of electrical contacts associated with a respective one of the first set of electrical contacts and being positioned in reverse symmetry with the first set of contacts;
whereby the electrical connector will electrically and physically mate to a corresponding receptacle when inserted into the receptacle, irrespective of whether the electrical connector is initially oriented in a first possible
10 alignment or a second possible alignment with respect to the receptacle.
29. The electrical connector of Claim 28 and further comprising a housing located around said tongue and being spaced apart from said tongue to allow at least part of said flexible tongue to be displaced towards one side or the other side of said housing.
30. The electrical connector of Claim 29 and further comprising a tongue tip at the end of said tongue which is
15 narrow at the end and wider adjacent said tongue such that said tongue tip will displace at least part of said flexible tongue to one side of the housing when the connector is inserted into a receptacle, the electrical contacts on said tongue thereby electrically and physically mating to the electrical contacts within the receptacle.
31. The electrical connector of Claim 30 wherein the first and second set of electrical contacts are configured for conducting the data signals and ground and supply voltages which comply with the universal serial bus (USB)
20 standard.
32. The electrical connector of Claim 31 wherein the connector mates with a receptacle that is a USB standard "A type" compliant receptacle.
33. The electrical connector of Claim 30, wherein:
the first set of electrical contacts is placed in an order starting from one side of the connector of a ground
25 voltage, a first signal A, a second signal B, and a positive supply voltage; and
the second set of electrical contacts is placed in a reverse order starting from the same side of the connector of the positive supply voltage, the second signal B, the first signal A, and the ground voltage;
whereby the signals on the top surface of the connector are always in the same order regardless of which side of the electrical connector is oriented upwards.

1/13

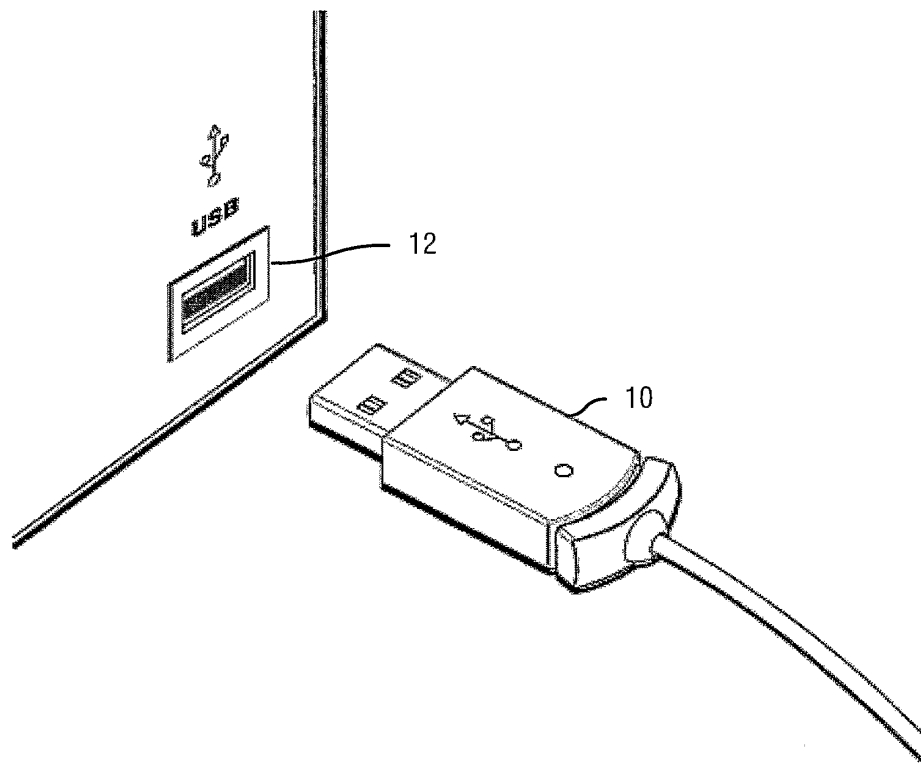


Fig. 1
(Prior Art)

2/13

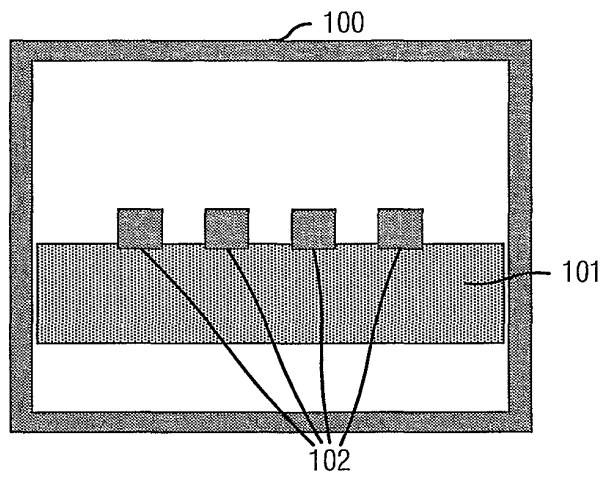


Fig. 2a
(Prior Art)

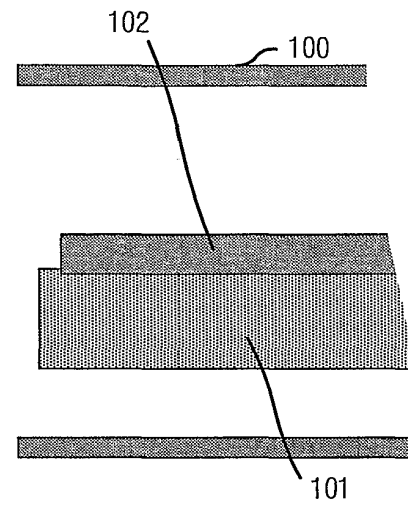


Fig. 2b
(Prior Art)

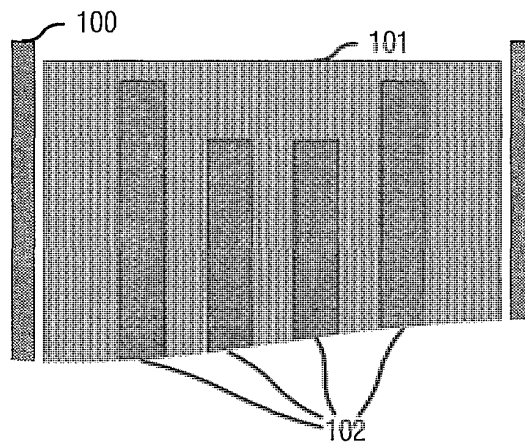


Fig. 2c
(Prior Art)

3/13

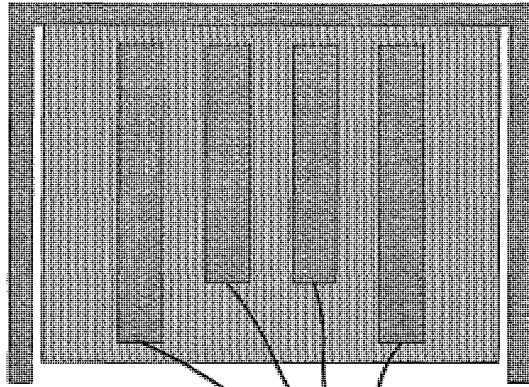


Fig. 3a
(Prior Art)

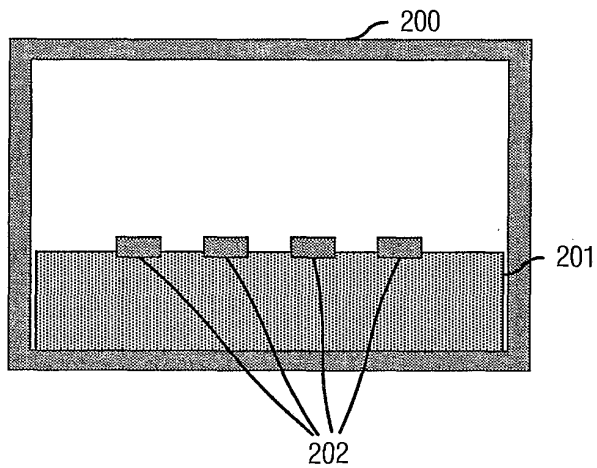


Fig. 3b
(Prior Art)

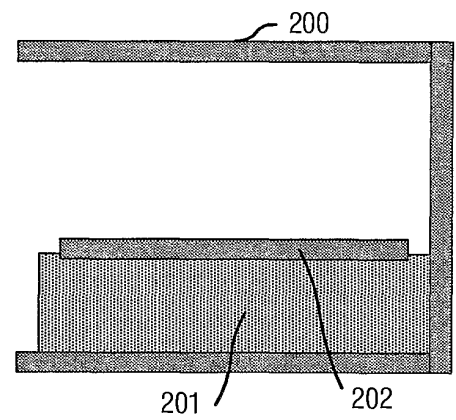


Fig. 3c
(Prior Art)

4/13

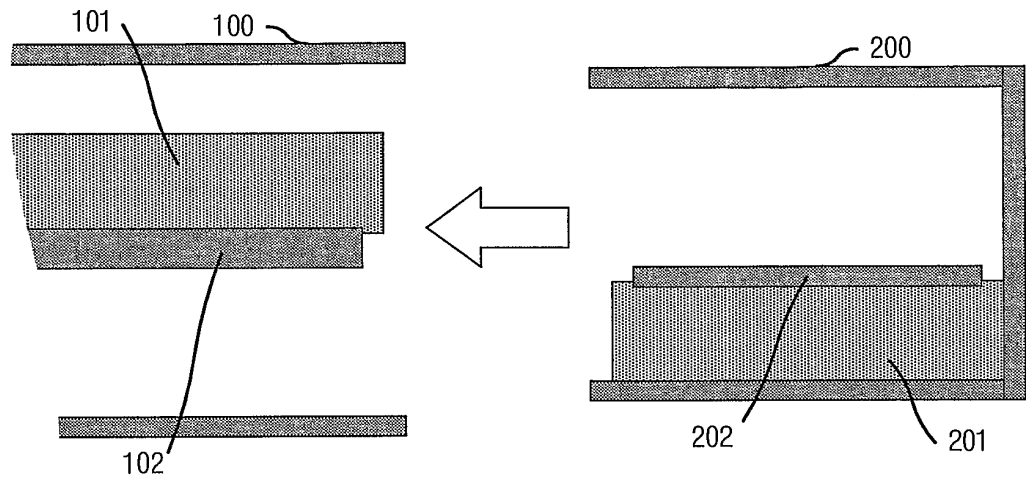


Fig. 4
(Prior Art)

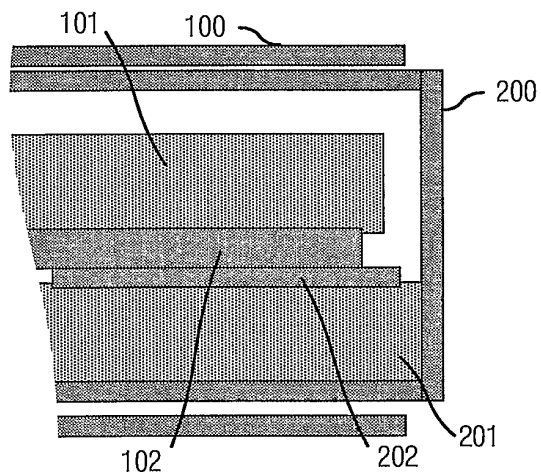


Fig. 5
(Prior Art)

5/13

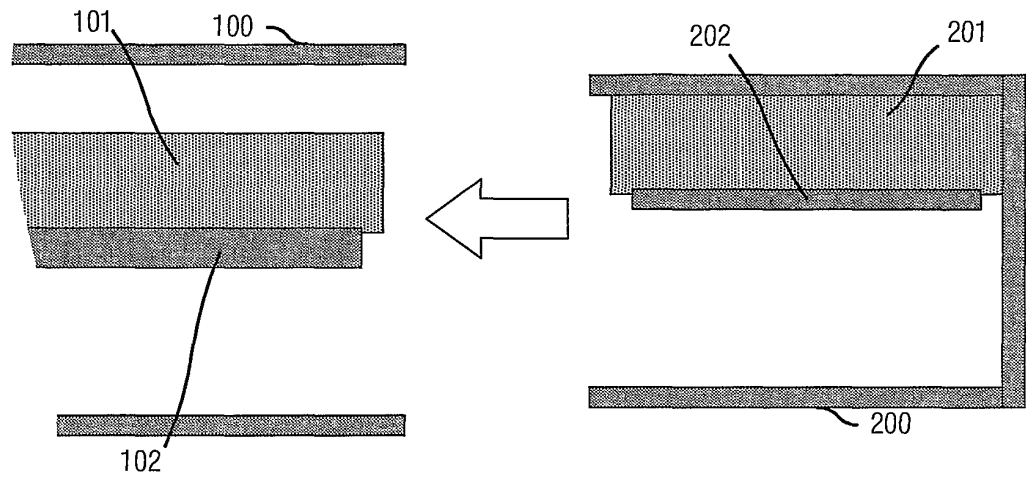


Fig. 6a
(Prior Art)

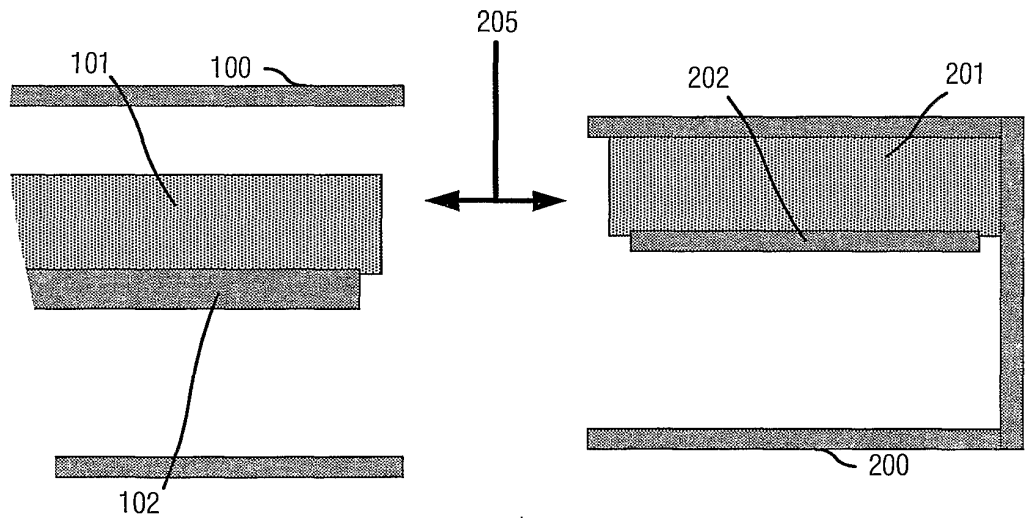


Fig. 6b
(Prior Art)

6/13

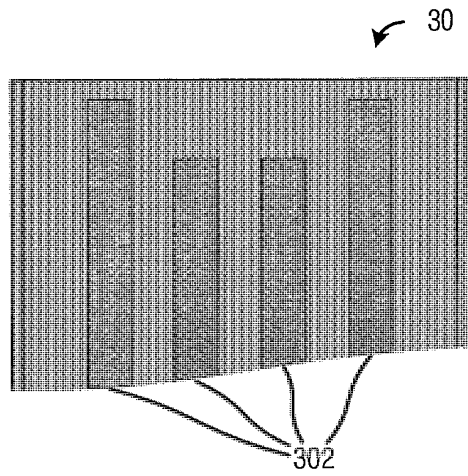


Fig. 7a

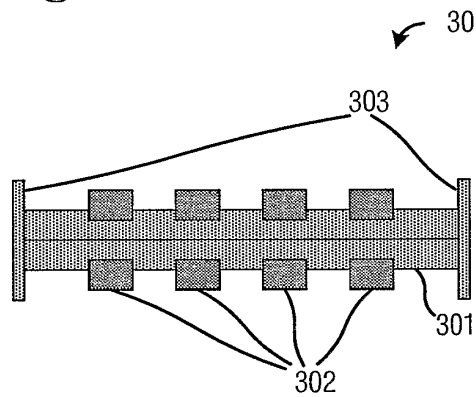


Fig. 7b

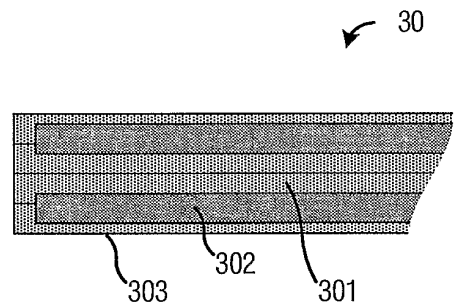


Fig. 7d

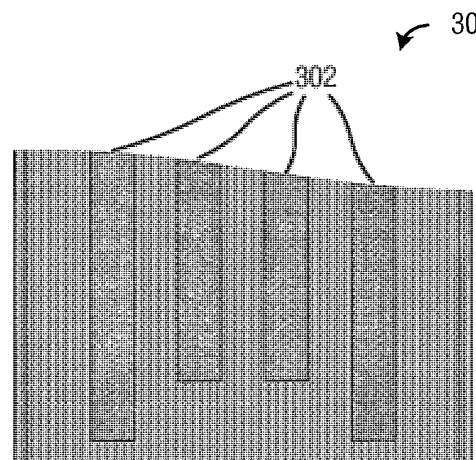


Fig. 7c

7/13

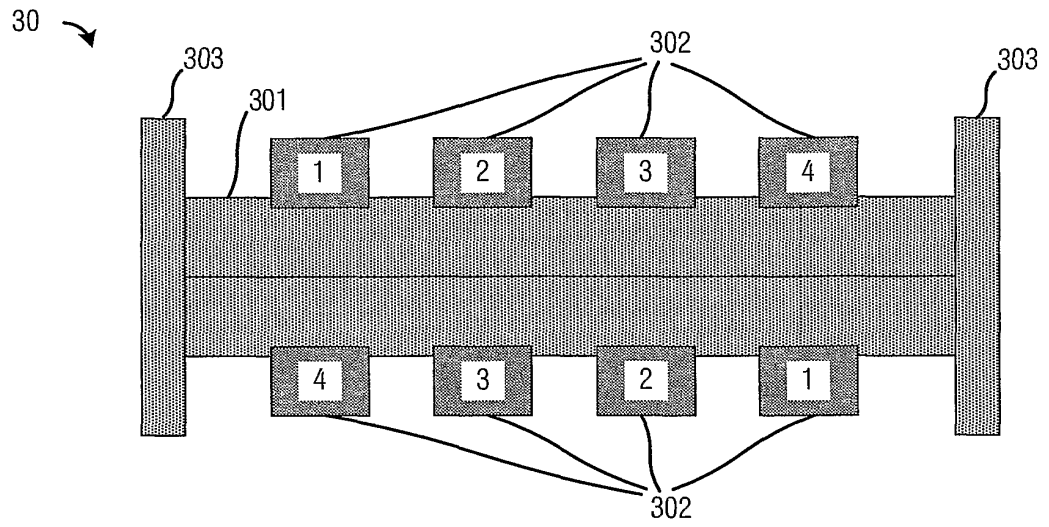


Fig. 8

8/13

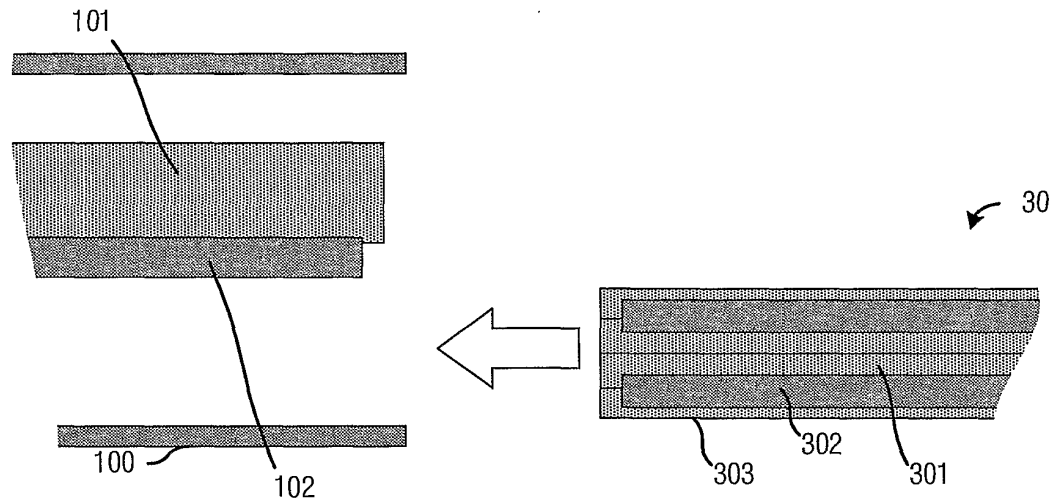


Fig. 9a

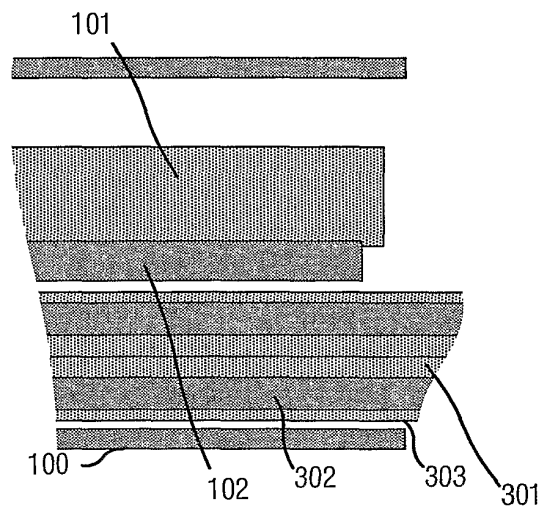


Fig. 9b

9/13

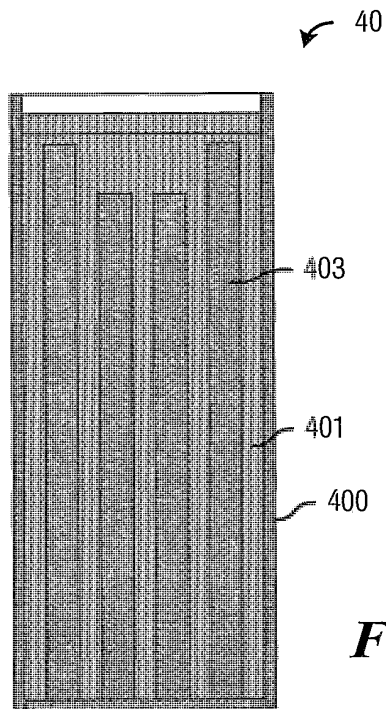


Fig. 10a

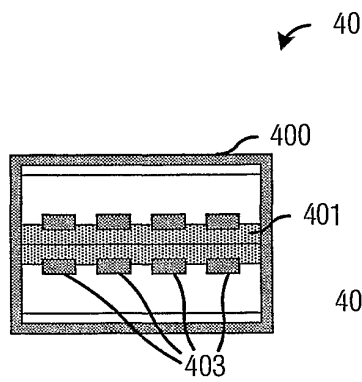


Fig. 10b

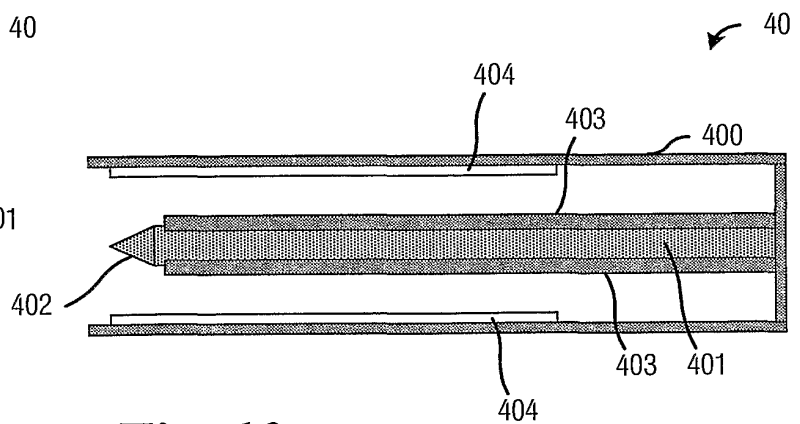


Fig. 10c

10/13

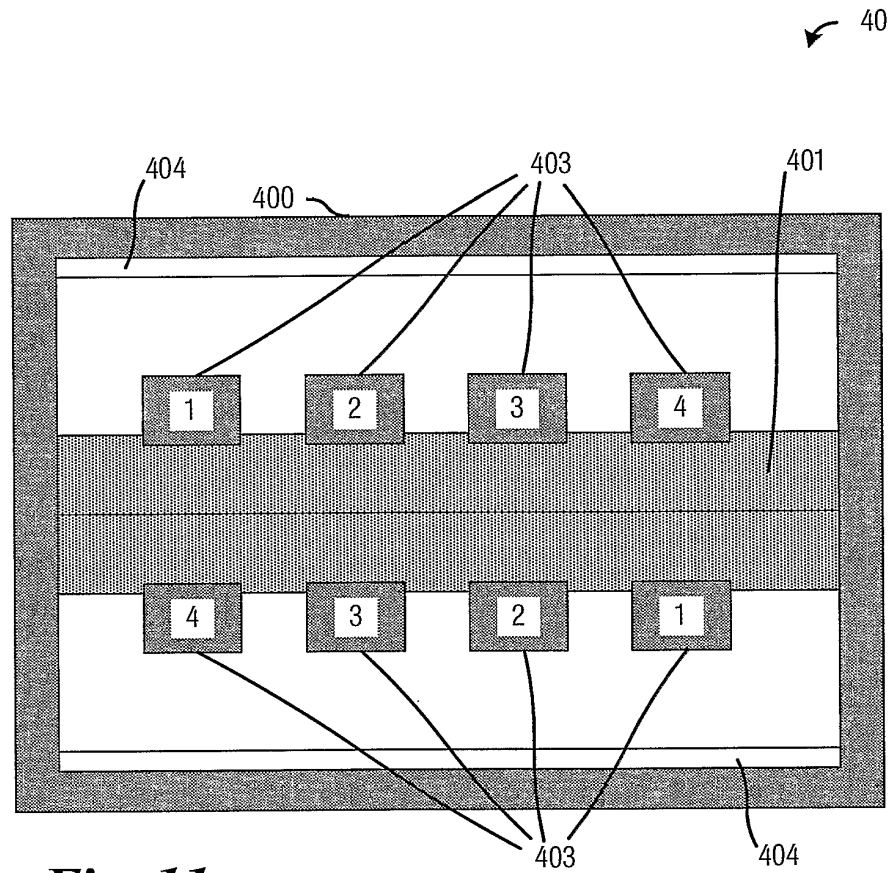


Fig. 11

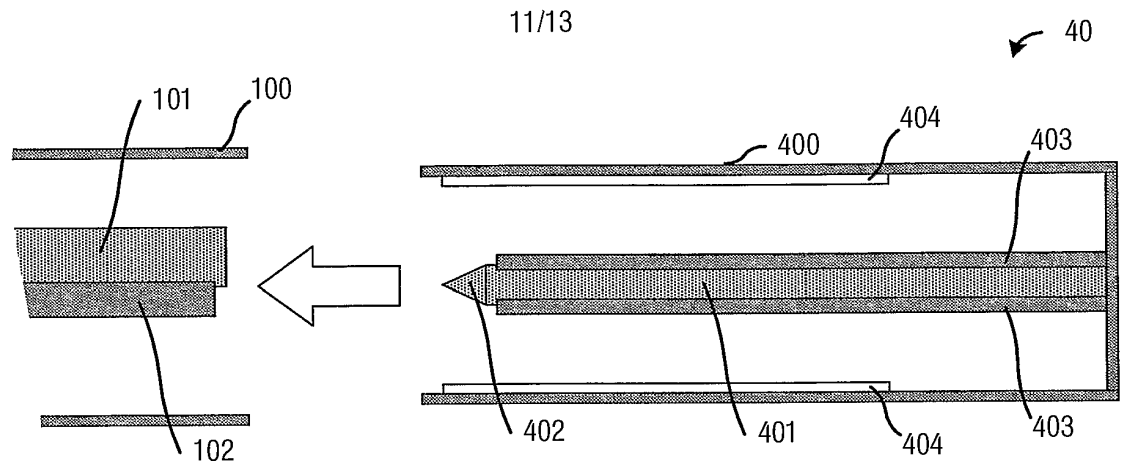


Fig. 12a

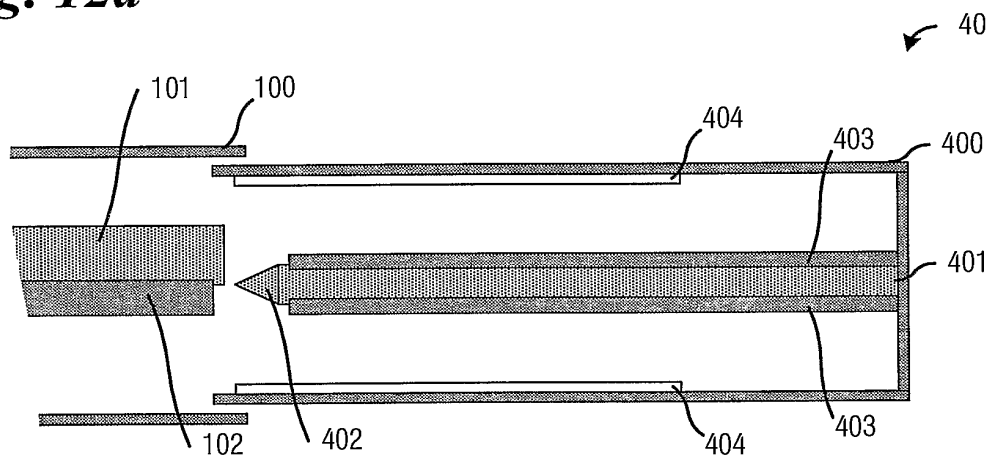


Fig. 12b

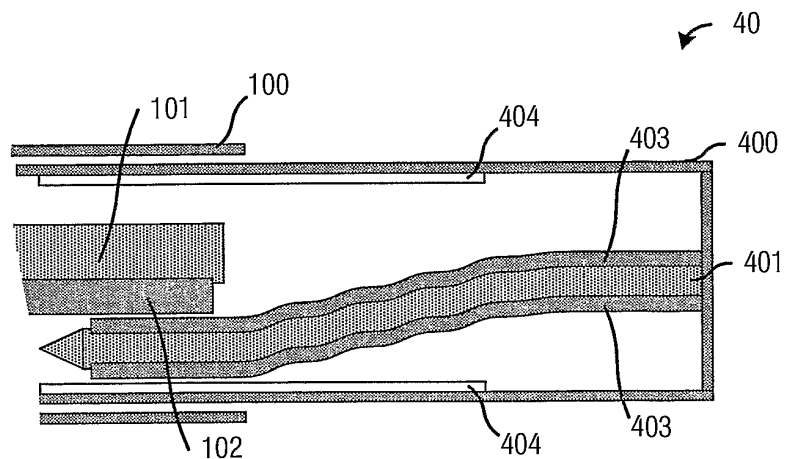


Fig. 12c

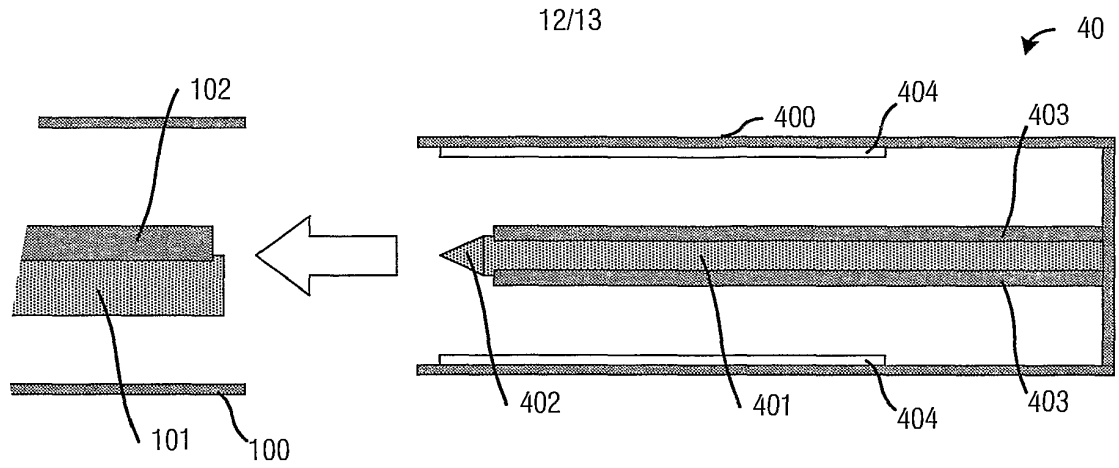


Fig. 13a

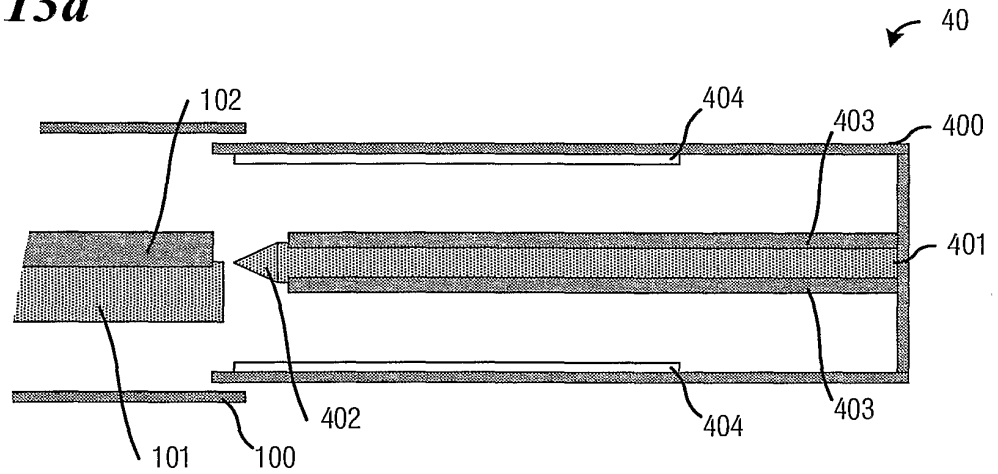


Fig. 13b

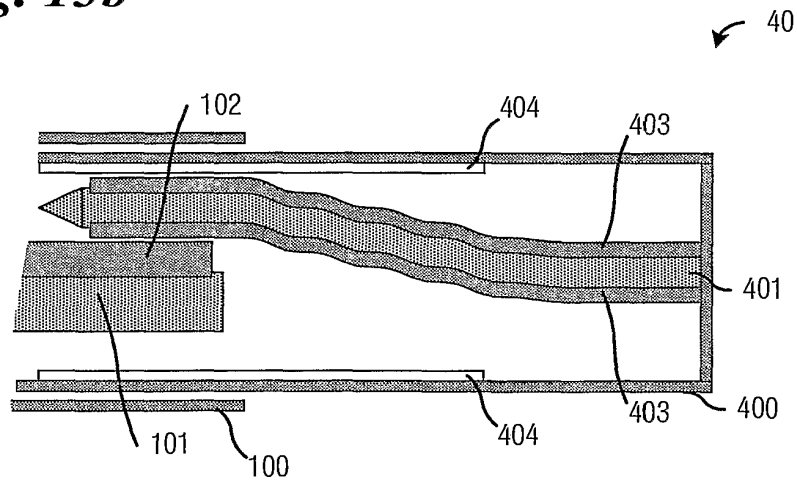


Fig. 13c

13/13

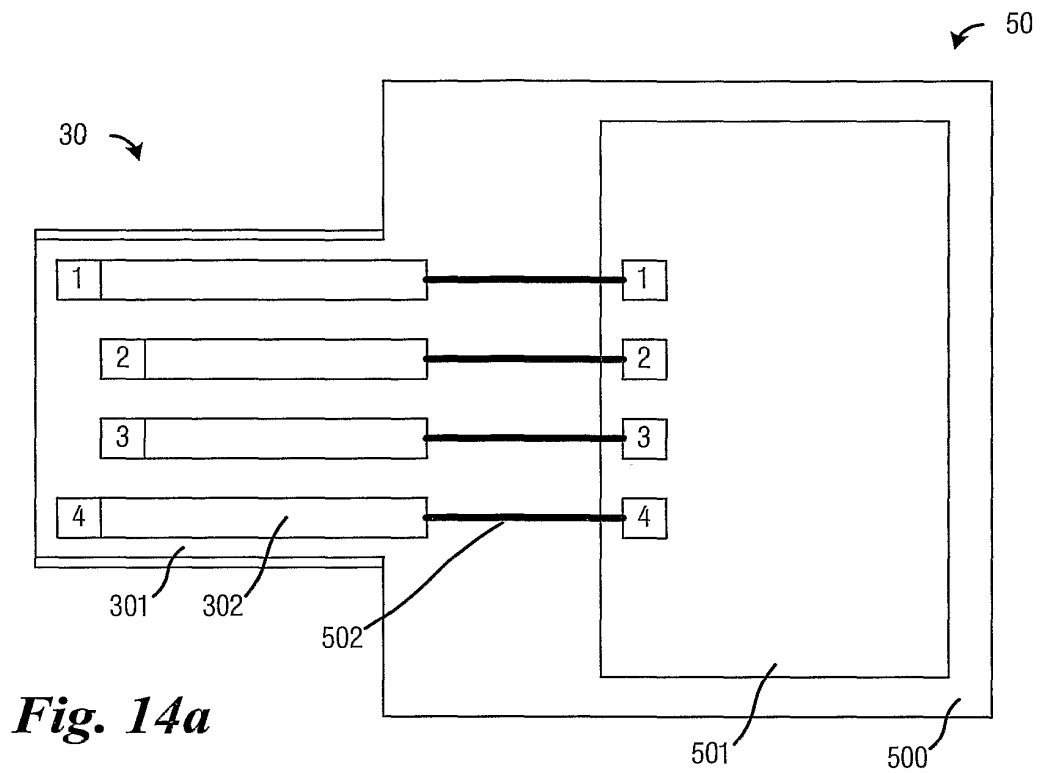


Fig. 14a

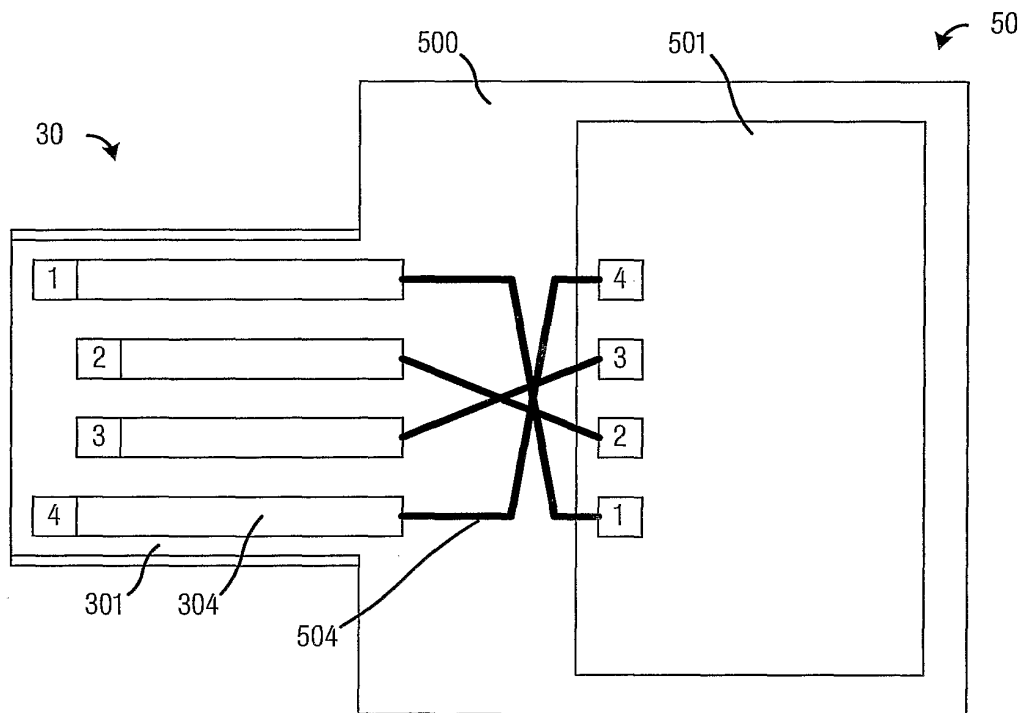


Fig. 14b

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/024167

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01R24/00 H01R12/18 H05K1/11

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)
IPC 7 H01R H05K

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 571 092 A (SUN MICROSYSTEMS INC) 24 November 1993 (1993-11-24) column 3, line 2 - line 6 column 7, line 42 - line 50	1
Y	-----	2-33
Y	DE 18 55 448 U (KRONE KG) 26 July 1962 (1962-07-26) the whole document	2-33
Y	-----	2-33
Y	US 2003/049949 A1 (ABE TAKASHI) 13 March 2003 (2003-03-13) the whole document	2-33
Y	-----	2-33
Y	US 2002/132506 A1 (JOHNSON ROSS S ET AL) 19 September 2002 (2002-09-19) the whole document	2-33
	----- -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *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.
- *G* document member of the same patent family

Date of the actual completion of the international search

10 December 2004

Date of mailing of the international search report

21/12/2004

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Salojärvi, K

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/024167

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 325 650 B1 (JOHNSON ROSS S ET AL) 4 December 2001 (2001-12-04) the whole document -----	2-33
Y	FR 2 583 929 A (BOGA SA) 26 December 1986 (1986-12-26) the whole document -----	2-33
Y	US 3 760 335 A (ROBERTS L) 18 September 1973 (1973-09-18) the whole document -----	2-33
Y	US 2003/100203 A1 (YEN SHENG SHUN) 29 May 2003 (2003-05-29) the whole document -----	2-33

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US2004/024167

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0571092	A	24-11-1993	US 5270964 A	14-12-1993
			DE 9321384 U1	11-09-1997
			DE 9321385 U1	11-09-1997
			DE 9321386 U1	11-09-1997
			DE 69326189 D1	07-10-1999
			DE 69326189 T2	05-01-2000
			EP 0571092 A2	24-11-1993
			EP 0813204 A2	17-12-1997
			EP 0813205 A2	17-12-1997
			EP 0926681 A2	30-06-1999
			JP 6348588 A	22-12-1994
			KR 235222 B1	15-12-1999
			SG 43928 A1	14-11-1997
			US 5383148 A	17-01-1995
			US 5465229 A	07-11-1995
			US 5532954 A	02-07-1996
			US 5973951 A	26-10-1999
DE 1855448	U	26-07-1962	NONE	
US 2003049949	A1	13-03-2003	JP 2003085122 A	20-03-2003
			US 2004185697 A1	23-09-2004
US 2002132506	A1	19-09-2002	US 6325650 B1	04-12-2001
			US 6135796 A	24-10-2000
			US 5938462 A	17-08-1999
			US 6267611 B1	31-07-2001
			US 5964609 A	12-10-1999
			AU 719381 B2	11-05-2000
			AU 5295696 A	14-08-1996
			BR 9606777 A	06-01-1998
			CA 2211192 A1	01-08-1996
			DE 69616754 D1	13-12-2001
			DE 69616754 T2	01-08-2002
			EP 0806069 A2	12-11-1997
			JP 11502695 T	02-03-1999
			WO 9623339 A2	01-08-1996
US 6325650	B1	04-12-2001	US 6135796 A	24-10-2000
			US 5938462 A	17-08-1999
			US 2002132506 A1	19-09-2002
			US 6267611 B1	31-07-2001
			US 5964609 A	12-10-1999
			AU 719381 B2	11-05-2000
			AU 5295696 A	14-08-1996
			BR 9606777 A	06-01-1998
			CA 2211192 A1	01-08-1996
			DE 69616754 D1	13-12-2001
			DE 69616754 T2	01-08-2002
			EP 0806069 A2	12-11-1997
			JP 11502695 T	02-03-1999
			WO 9623339 A2	01-08-1996
FR 2583929	A	26-12-1986	FR 2583929 A1	26-12-1986
US 3760335	A	18-09-1973	AT 328016 B	25-02-1976
			AT 453672 A	15-05-1975
			AU 460356 B2	07-04-1975

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US2004/024167

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3760335 A		AU 4102972 A BE 784071 A1 CA 963551 A1 CH 535499 A DE 2224326 A1 DK 135738 B ES 402262 A1 FI 59184 B FR 2138961 A1 GB 1361114 A HK 22579 A IL 39213 A IT 953712 B JP 55003797 B NL 7206797 A ,B, NO 132611 B SE 389582 B SE 407495 B SE 7509529 A ZA 7202373 A	18-10-1973 27-11-1972 25-02-1975 31-03-1973 07-12-1972 13-06-1977 16-03-1975 27-02-1981 05-01-1973 24-07-1974 06-04-1979 10-02-1975 10-08-1973 26-01-1980 29-11-1972 25-08-1975 08-11-1976 26-03-1979 27-08-1975 27-12-1972
US 2003100203 A1	29-05-2003	TW 555105 Y TW 570242 Y JP 2003167646 A US 2004029421 A1 US 2004027817 A1 US 2004029422 A1 US 2004038565 A1 US 2004027812 A1	21-09-2003 01-01-2004 13-06-2003 12-02-2004 12-02-2004 12-02-2004 26-02-2004 12-02-2004

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
5 June 2008 (05.06.2008)

PCT

(10) International Publication Number
WO 2008/065659 A2

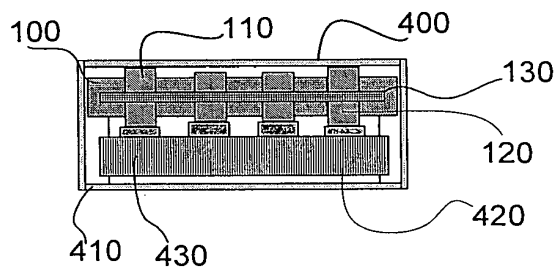
- (51) International Patent Classification:
H01R 13/26 (2006.01) *H01R 13/658* (2006.01)
H01R 13/62 (2006.01)
- (21) International Application Number:
PCT/IL2007/001470
- (22) International Filing Date:
28 November 2007 (28.11.2007)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/867,614 29 November 2006 (29.11.2006) US
- (71) Applicant (for all designated States except US): **WAL-
LETEX MICROELECTRONICS LTD.** [IL/IL]; 33
Lazarov Street, 75654 Rishon Lezion (IL).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **COHEN, Yohan**
[IL/IL]; 7/10 Sokolov Street, 45289 Hod Hasharon (IL).

- (74) Agent: **REINHOLD COHN AND PARTNERS**; P.O.
Box 4060, 61040 Tel Aviv (IL).
- (81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH,
CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG,
ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL,
IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK,
LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW,
MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL,
PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY,
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA,
ZM, ZW.
- (84) Designated States (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished
upon receipt of that report*

(54) Title: MALE DATA COMMUNICATION CONNECTOR HAVING CONTACTS OF DIFFERENT HEIGHT

cross sectional view on B-B



(57) Abstract: A multi-contact connector (100) having a set of contacts (110, 120) supported on a planar substrate (130) in proper spatial alignment for engaging corresponding contacts (420) of a female receptacle (400) having an internal shield (410). At least one contact in the contact set has an active surface that is offset relative to the planar substrate by a greater distance than the respective active surfaces of other contacts in the contact set so as to mechanically create a space between the shield and the other contacts of the contact set when the connector is inserted within the receptacle. A pair of contact sets may also be provided, each on an opposite surface of the planar substrate.

WO 2008/065659 A2

Male data communication connector having contacts of different height

FIELD OF THE INVENTION

This invention relates generally to the field of data connectors.

BACKGROUND OF THE INVENTION

Data connectors are well known and include USB connectors, IEEE 1394
5 connectors, cellular phone connectors and so on. Advances in technology have increased the data transfer rate of the devices using such connectors.

The USB connector is also common and is used for peripheral devices such as a computer mouse, a keypad, a printer and similar devices. Current methods for USB connection, for example, use a housing supporting only four contacts pads (VCC, D-,
10 D+, GND) as needed for USB communication. The contacts are implemented on a substrate and are of the same height in order to connect to complementary resilient contacts of the USB female connector. Over the last ten years, the size of some USB devices has been reduced to fit inside a user's wallet or pocket, thus requiring the provision of a thin USB connector that uses only the inner space of the USB host
15 connector to effect connection. This has been achieved in part by suppressing the outer shield provided in conventional male USB connectors in order to reduce the thickness of the male connector. This is not an entirely satisfactory solution since the shield is used to reduce electromagnetic radiation and its elimination is therefore not desirable.

USB connectors currently have a housing supporting only four contacts (VCC,
20 D-, D+, GND) as needed for USB communication, and are designed to avoid contact with the host device shield.

WO2005/124932 published December 29, 2005 and entitled "*Improved connector and device for flexibly connectable computer systems*" discloses a double-sided male USB connector and various card-shaped devices having one or more male
25 USB connectors, which may be single-sided or double-sided and are dimensioned to fit into a USB receptacle. The device can have a rechargeable power source that is fed power via the connector's power lines. The device can be manufactured from flexible material using a lamination process and may be configured to communicate with a broad variety of other electronic devices. The full contents of WO2005/124932 are incorporated
30 herein by reference.

When the double-sided male USB connector described in WO2005/124932 is inserted into a female receptacle having only a single set of contacts, the exposed contacts on an inactive surface of the connector that is disposed so as not to make contact with the contacts in the female receptacle will lie proximate the outer shielding of the receptacle. Since these contacts are electrically coupled to the contacts on the active surface, which engage the contacts of the receptacle, there is the danger that the exposed contacts may touch the outer shielding of the receptacle thereby shorting data to ground. This of course must be avoided. To this end, WO2005/124932 provides short-circuit protection in order that the contacts on the inactive surface of the connector be effectively disconnected from the shielding via reverse biased rectifier diodes that prevent data from flowing into the shield and ensuring operability of the connector even if inactive contacts of the connector touch the shielding of the receptacle.

No such shielding is required if only a single set of contacts is provided since in such case there are no exposed contacts on the inactive surface of the connector that can touch the shielding.

In the case of both single- and double-sided connectors there may be the need to provide a shield contact to engage the shielding of the female receptacle.

BRIEF SUMMARY OF THE INVENTION

In accordance with one embodiment, the invention provides a double-sided connector having at least two contact pads each having contacts of different respective heights and capable of connecting to a host device. In each contact set, at least one contact is elongated so that even when it engages the outer shield of the receptacle, this will leave a sufficiently large gap between the remaining contacts and the outer shield thus ensuring continuous operability of the connector.

In accordance with some embodiments, the electrical signal contacts of each contact pad that can be damaged by, or will suffer from, or will be electrically impaired by such contact with the receptacle shield are elongated.

In accordance with other embodiments, a short-circuit protection device is provided in association with the elongated contacts so that contact with the receptacle shield does not impair operability of the connector.

In accordance with some embodiments, there are electrically coupled to one of the data connector pads additional pads that can effect contact with the receptacle shield

in order to create mechanical space between the shield and the other connector pads that must be electrically isolated from the receptacle shield.

According to one embodiment of the invention, there is provided a male multi-contact data connector having two set of contacts supported on opposite surfaces of a planar substrate, respective contacts in each contact set being in proper spatial
5 alignment for engaging corresponding contacts of a female receptacle having an internal shield and a single set of contacts that is compatible with either one of said sets of contacts, wherein:

corresponding contacts in each set are spatially aligned in anti-phase relationship
10 so as to allow the connector to be connected in two opposed orientations to said female receptacle;

in each contact set there is at least one elongated contact that is permitted to make contact with the shield without impairing operability of the connector; and

the at least one elongated contact in each contact set has an active surface that
15 is offset relative to the surface of the planar substrate by a greater distance than the respective active surfaces of other contacts in said set so as to mechanically create a space between the shield and the other contacts of said set when the connector is inserted within the receptacle with the contacts of said set disposed so as not make contact with the contacts in the female receptacle. According to another embodiment of
20 the invention, there is provided a multi-contact male data communication connector having no outer shield and comprising:

a body portion for accommodating a planar substrate therein;

a set of contacts supported on the planar substrate in proper spatial alignment for
engaging corresponding contacts of a female receptacle having an internal shield; and

25 at least one shield contact supported by the body portion and configured to connect electrically to the internal shield of the female receptacle when the connector is inserted into the female receptacle.

According to yet another embodiment of the invention, there is provided a male data communication connector comprising:

30 a body portion supporting at least one set of electrical contacts for engaging corresponding contacts of a receptacle formed at least partially of ferromagnetic material; and

a magnet supported by the body portion for securing electrical contact of the connector with the receptacle.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention and to see how it may be carried out in practice, some embodiments will now be described, by way of non-limiting example only, with reference to the accompanying drawings, wherein:

5 **Figs. 1a and 1b** show respectively side and plan views of a male data communication connector having contacts of different respective heights in accordance with an embodiment of the invention;

Fig. 2 is a cross-sectional view along the line A-A in Fig 1a;

Figs. 3 is a perspective view of the USB male communication data connector
10 shown in Figs. 1 and 2;

Fig. 4 is a perspective view of a convention prior art type-A USB host receptacle;

Figs. 5a and 5b show respectively perspective and cross-sectional views of the connector shown in Figs. 1a and 1b, when connected to the USB receptacle shown in Fig. 4;

15 **Fig. 6** is an exploded view of a male USB data connector having a PCB and an outer shield in accordance with another embodiment of the invention;

Figs. 7a and 7b show respectively plan and side views of the connector shown in Fig. 6;

Figs. 8a and 8b show respectively plan and side views of a USB male connector
20 according to one embodiment;

Figs. 9a and 9b show respectively plan and side views of a USB male connector according to another embodiment;

Fig. 10a is a perspective view of an USB receptacle having an outer shield;

Figs. 10b and 10c show respectively connection of shield contacts in the USB
25 male connectors shown in Figs. 8 and 9 to the receptacle shield shown in Fig. 10a;

Figs. 11 to 13 show construction features of the connector according to other embodiments of the invention; and

Figs. 14 and 15 illustrate schematically prior art approaches to preventing electric short circuit between the inactive contacts of a double-sided male connector and
30 the shield of a female receptacle.

The drawings constitute a part of this specification and include exemplary embodiments to the invention, which may be embodied in various forms. It is to be understood that in some instances various aspects of the invention may be shown exaggerated or enlarged to facilitate an understanding of the invention.

DETAILED DESCRIPTION OF EMBODIMENTS

Detailed descriptions of the preferred embodiment are provided herein. It is to be understood, however, that the present invention may be embodied in various forms. Therefore, specific details disclosed herein are not to be interpreted as limiting, but rather as a basis for the claims and as a representative basis for teaching one skilled in the art to employ the present invention in virtually any appropriately detailed system, structure or manner. In the following description, identical components that appear in different figures or that serve an identical function will be referenced by the same reference numerals.

Figs. 1a and 1b show respectively side and plan views of a male data communication connector **100** having contacts of different respective heights. The connector has two sets of contacts **110** and **120** that protrude from and are supported by opposing surfaces of a planar substrate **130** supported within a body **140** (shown in **Fig. 2**). Corresponding contacts in each set are spatially aligned in anti-phase relationship allowing the connector to be connected in two opposed orientations to a corresponding female receptacle having only a single set of contacts that is compatible with either one of the contact sets and an internal shield. A suitable receptacle is described below with reference to **Figs. 4 and 5** of the drawings. The connector may be a standard type A USB connector although it is not limited thereto.

Fig. 2 is a cross-sectional view along the line A-A in **Fig 1a** showing the internal planar substrate **130** that supports the two sets of contacts **110** and **120**. The body **140** envelops the planar substrate **130** and the two sets of contacts **110** and **120** such that at least one contact in each set of contacts is elongated so as to protrude from the body **140**, whereby the active surface of the elongated contact or contacts is displaced a greater height from the substrate **130** than the corresponding active surfaces of the remaining contacts that may be substantially flush with the substrate **130**. By "active surface" is meant that surface of the contact that engages a complementary contact surface in the female receptacle.

In accordance with one embodiment, only those contacts in each contact set are elongated that may contact the internal shield of the receptacle. For example, the GND contacts may be elongated while the D-, D+ may not be elongated so as to prevent data being shorted to ground via the internal shielding of the receptacle. However, in accordance with another embodiment, short-circuit protection between the two contacts

sets is provided in a manner as described in above-referenced WO2005/124932. In this case, any of the contacts may be elongated.

Fig. 3 shows a perspective view of the USB male communication data connector described above with reference to Figs. 1a, 1b and 2 of the drawings.

5 **Fig. 4** is a perspective view of a standard type-A USB host receptacle **400** showing an internal surface of a host receptacle shield **410** that engages the active surface of the protruding contacts of either one set of contacts in the male connector. The receptacle has a set of contacts **420** supported on a block **430** and configured to engage either set of contacts of the male connector **100**.

10 **Fig. 5a** is a perspective view of the male data communication connector **100** shown in **Figs. 1a and 1b**, when connected to the host female USB receptacle **400**.

Fig. 5b is a cross-sectional view along the line B-B in **Fig. 5a** showing the connection between the contacts **420** in the host female USB connector and either the first or second sets of contacts **110** and **120**, respectively, of the male connector **100**. It is seen that the contacts **110** on the upper surface of the connector **100** are "inactive" in that they do not make contact with the contacts **420** in the female receptacle **400**. In contrast, the contacts **120** may be said to be "active".

Fig. 6 is an exploded view of a male USB data connector **600** according to another embodiment of the invention. The connector **600** comprises a PCB **601** and at least one shield contact **602** that serves to connect to a connector shield in a host device. The PCB **601** also integrates a set of USB contacts **603** comprising four contacts GND, D+, D-, Vbus as needed for USB connection. In the figure, two shield contacts **602** are provided each in the form of a metal band whose ends engage metal shielding pads **604** on the PCB. However, this is illustrative only and any other suitable manner for connecting the shield contacts may be employed, some of which will be described albeit by way of non-limiting example with reference to **Figs 8 and 9** below.

Figs. 7a and 7b show respectively plan and side views of the connector **600** according to one embodiment wherein the shield contacts **602** are disposed along side edges of the PCB **601** and extend at least along a major dimension of the connector.

30 **Figs. 8a and 8b** show respectively plan and side views of the connector according to one embodiment assembled in a plastic body portion **605** dimensioned for proper insertion into a female USB receptacle. The shield contact **602** extends along a side edge of the body portion **605**, which supports respective USB contacts **603** on opposing surfaces thereof.

Figs. 9a and 9b show respectively plan and side views of an assembled connector according to another embodiment, whose body portion **605** supports at least two shield contacts **602** each on a respective opposing major planar surface thereof and serving for contact with a connector shield in a host device. The body portion **605** further comprises opposing sets of USB contacts **603** also supported on opposing major planar surfaces of the connector.

Fig. 10a is a perspective view of a USB host receptacle **650** showing a host receptacle shield **651** formed at least partially of ferromagnetic material and having an internal surface **652** that effects electrical contact with one of the dedicated shield contacts **602** of the connector as shown in **Fig. 9b**.

Fig. 10b is a perspective view of the male connector **600** shown in **Figs. 8a and 8b** when connected to the host female USB connector **650** and showing contact between the host connector shield **651** and the shield contact **602** of the male data connector. By way of example only, the connector **600** is double-sided, there being also shown the inactive contact set on the upper (inactive) surface of the connector.

Fig. 10c is a perspective view of the connector shown in **Figs. 9a and 9b** when connected to a host female USB connector **650** and showing contact between the host connector shield **651** and the shield contact **602** of the male data connector.

Fig. 11 is a plan view of a male USB connector having a body portion **605** supporting on opposite major planar surfaces thereof respective shield contacts **602** serving to make contact with the host connector shield. The same planar surfaces support opposed sets of USB contacts as described above with reference to **Fig. 9a**. The connector is further provided with one or more magnets **660** fixed to both major surfaces of the connector for securing connection of the shield contacts **602** with the complementary metal shield **651** of a host female USB connector by virtue of the resulting magnetic attraction between the magnets **602** and the metal shield.

Fig. 12 is a perspective view of an USB data connector **600** comprising a set of USB-compatible contacts **603** and having a peripheral shield contact **602** supported on side edges of the PCB so as to engage the host connector shield during connection. The connector **600** is integrated within a device having a body portion **670**; the shield contact **602** having an elongated portion **671** that extends into the body portion **670** to reinforce the mechanical connection strength of the USB data connector to the body portion. This reduces the risk fracture at the junction **672** between the connector **600** and the body **670**, the junction being shown by the dashed line in the drawing.

Fig. 13 is a plan view of a PCB **601** having a peripheral shield contact **602** and supporting a set of USB contacts **603** on a surface of the PCB. The peripheral shield contact **602** is shaped to protrude from the edges of the PCB **601** that are exposed to the host connector shield.

5 As noted above, in accordance with one aspect of the invention, some elongated contacts in a double-sided male connector may be able to contact the internal shielding of the receptacle without impairing the operability thereof. In other situations, such as when the data contact **D+** or **D-** is elongated, short circuit protection must be provided.

Figs. 14 and 15 illustrate schematically prior art approaches to preventing
10 electric short circuit between the inactive contacts of a double-sided male USB connector **100** and the grounded shield of a female USB receptacle as described in WO 2005/124932. The two contacts sets **110** and **120** comprise complementary pairs of anti-phase contacts (c1, c8), (c2, c7), (c3, c6), and (c4, c5), respectively. Contacts c1 and c8 are commonly connected to the GND connection of the receptacle. Likewise,
15 contacts c4 and c5 are commonly connected to the VBUS connection of the receptacle. Each of the contacts c4 and c5 in the male USB connector **100** is connected to the anode of a respective diode **D1** and **D2**. When contact c4 engages the VBUS contact of the USB receptacle and is thus at positive potential, the diode **D1** conducts but since the contact c5 on the opposite surface of the USB male connector engages the internal
20 shield **651** of the receptacle **650** and is therefore connected to GND, the diode **D2** is reverse biased and so opposes current flow. The opposite occurs when the male USB connector is inverted such that contact c4 is either at floating potential or is short-circuited to GND via the internal shield **651** of the receptacle **650**. By such means, the possibility of a short circuit between VBUS and GND is avoided upon inverting the male
25 USB connector. The VBUS contacts of the male USB connector **100** corresponding to the contacts c4 and c5 are routed via the diodes to a single VBUS contact. Likewise the GND contacts corresponding to the contacts c1 and c8 are routed to a single GND contact. It will be appreciated that the diodes can be used in such manner to prevent a short circuit with either a double sided USB connector or a single sided USB connector
30 that is inserted such that its contacts face the opposite side of the receptacle USB contacts, thereby risking short circuit with the internal shield **651** of the receptacle **650**.

Fig. 15 shows an alternative solution to the short circuit problem, wherein the VBUS and GND contacts of the male connector **100** are connected to a relay **675** that transfers only forward current from the VBUS contacts and does not open the circuit if

GND is in contact with one of the VBUS wires. Alternatively, the relay 675 may also be connected to each of the VBUS contacts by itself.

The embodiments shown in Figs. 1b and 6 and their derivatives have been described as though they are mutually independent – as indeed they may be. Thus, the
5 embodiments shown in Figs. 1 to 5 do not need an auxiliary shield contact and the
embodiments shown in Figs. 6 to 13 do not need to be double-sided and so have no
need for contacts of different effective heights. However, in accordance with another
embodiment of the invention, the connector 100 may be provided with an auxiliary shield
10 contact that serves to engage the internal shield of the receptacle. Such an auxiliary
contact may be as described above with reference to Figs. 6 to 13.

While the invention has been described in connection with a number of
embodiments, it is not intended to limit the scope of the invention to the particular form
set forth, but on the contrary, it is intended to cover such alternatives, modifications, and
equivalents as may be included within the spirit and scope of the invention as defined by
15 the appended claims.

Specifically, while a preferred embodiment has been described with regard to a
male data connector having two sets of contacts on opposing surfaces of the connector,
it will be appreciated that the invention is equally applicable to connectors having only a
single set of contacts on a single surface of the connector.

20 USB is an acronym for Universal Serial Bus, which has become the
universal standard for connecting peripherals to computer motherboards. Although some
embodiments of the invention have been described with particular reference to the USB
standard, it is to be understood that the principles of the invention are equally applicable
to other standards and particularly to connectors having different contact arrangements
25 than the USB standard. It is therefore to be understood that the invention both as
described and as claimed is not intended to be limited to any specific standard and the
more generic term “flexibly connectable computer systems” abbreviated as FCCS will be
used to denote any interface standard for allowing devices to be connected to a
computer.

30 Specifically, the connector can be any other connector type having an outer
shield such as MiniUSB, MicroUSB, cellular phones, etc.

It should be also noted that while the use of a magnet for securing contact
between a male and female USB connector has been described with particular reference
to a planar connector supporting a pair of USB contact sets on opposing surfaces

thereof, it is to be noted that a magnetic pull may be used to good effect also with data connectors having only a single contact set. Likewise, although in the described embodiments the magnet serves to exert a magnetic pull on the metal shield of the receptacle, any ferromagnetic material may be attached to the inside of the receptacle to
5 provide the required attractive force. In this case, the host receptacle shield 651 need not necessarily be formed of ferromagnetic material.

Finally it should be noted that, when provided, each elongated contact may be of uniform height over the whole of its surface or, alternatively, may be stepped so long as the active surface of the contact is of uniform height.

CLAIMS:

1. A male multi-contact data connector (100) having two set of contacts (110, 120) supported on opposite surfaces of a planar substrate (130), respective contacts in each contact set being in proper spatial alignment for engaging corresponding contacts of a female receptacle (400) having an internal shield (410) and a single set of contacts that is compatible with either one of said sets of contacts, wherein:
 - corresponding contacts in each set are spatially aligned in anti-phase relationship so as to allow the connector to be connected in two opposed orientations to said female receptacle;
 - in each contact set there is at least one elongated contact that is permitted to make contact with the shield without impairing operability of the connector; and
 - the at least one elongated contact in each contact set has an active surface that is offset relative to the surface of the planar substrate by a greater distance than the respective active surfaces of other contacts in said set so as to mechanically create a space between the shield and the other contacts of said set when the connector is inserted within the receptacle with the contacts of said set disposed so as not make contact with the contacts in the female receptacle.
2. The connector according to claim 1, further comprising at least one shield contact (602) disposed on a body portion (605) of the connector that is electrically connected directly or via electrical components to at least one elongated contact of the first or second set of contacts.
3. The connector according to claim 2, wherein the at least one shield contact is disposed along a side edge of the body portion.
4. The connector according to claim 2 or 3, wherein the at least one shield contact extends along a side edge of the body portion.
5. The connector according to claim 2, wherein the at least one shield contact is disposed on an exposed surface of the body portion.
6. The connector according to any one of claims 1 to 5, wherein the at least one shield contact is configured to reinforce the connector.

7. The connector according to any one of claims 1 to 6, wherein the at least one elongated contact is not a data contact.
8. The connector according to any one of claims 1 to 6, wherein the at least one elongated contact is a data contact and said connector further comprises a short circuit prevention device (D1, D2, 675) to prevent an electric short circuit between inactive contacts of the connector and the shield of the receptacle on inserting the connector therein.
9. The connector according to any one of claims 1 to 8, being an FCCS connector.
10. The connector according to any one of claims 1 to 9, further comprising a magnet (660) disposed on an exposed surface of the connector for securing the connector within a receptacle formed at least partially of ferromagnetic material.
11. A multi-contact male data communication connector having no outer shield and comprising:
a body portion (605) for accommodating a planar substrate therein;
a set of contacts (110, 120) supported on the planar substrate (130) in proper spatial alignment for engaging corresponding contacts of a female receptacle (400) having an internal shield (410); and
at least one shield contact (602) supported by the body portion and configured to connect electrically to the internal shield of the female receptacle when the connector is inserted into the female receptacle.
12. The connector according to claim 11, wherein the at least one shield contact is disposed along a side edge of the body portion.
13. The connector according to claim 11 or 12, wherein the at least one shield contact extends along a side edge of the body portion.
14. The connector according to claim 11, wherein the at least one shield contact is disposed on an exposed surface of the body portion.
15. The connector according to any one of claims 11 to 14, wherein the shield contact is configured to reinforce mechanical strength of the connector.

16. The connector according to any one of claims 11 to 15, further comprising a magnet (660) disposed on an exposed surface of the body portion for securing the connector within the receptacle.

17. The connector according to claim 11 to 16, comprising first and second sets of contacts (110, 120) each supported on a respective opposing surface of the connector, wherein:

corresponding contacts in each set are spatially aligned in anti-phase relationship so as to allow the connector to be connected in two opposed orientations to a female receptacle (400) having only a single set of contacts (420) that is compatible with either one of said sets of contacts.

18. The connector according to claim 17, wherein:

in each contact set there is at least one elongated contact that is permitted to make contact with the internal shield of the female receptacle without impairing operability of the connector; and

the at least one elongated contact in each contact set has an active surface that is offset relative to the surface of the planar substrate by a greater distance than the respective active surfaces of other contacts in said set so as to mechanically create a space between the shield and the other contacts of said set when the connector is inserted within the receptacle with the contacts of said set disposed so as not make contact with the contacts in the female receptacle.

19. The connector according to claim 18, wherein the at least one elongated contact is not a data contact.

20. The connector according to claim 18, wherein the at least one elongated contact is a data contact and said connector further comprises a short circuit prevention device (D1, D2, 675) to prevent an electric short circuit between inactive contacts of the connector and the shield of the receptacle on inserting the connector therein.

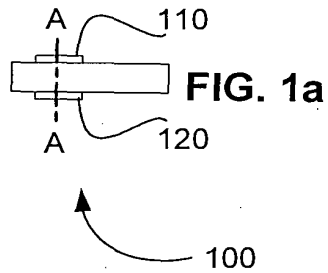
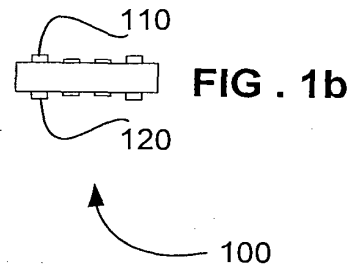
21. The connector according to any one of claims 11 to 20, being an FCCS connector.

22. A male data communication connector comprising:
a body portion (605) supporting at least one set of electrical contacts (110, 120) for engaging corresponding contacts (420) of a receptacle (400) formed at least partially of ferromagnetic material; and
5 a magnet (660) supported by the body portion for securing electrical contact of the connector with the receptacle.
23. The data connector according to claim 22, further comprising a shield contact (602) for contacting a metal shield (410) of the receptacle thereby obviating a need for the connector to be provided with its own outer shield and wherein the magnet is
10 adapted to exert a magnetic pull on the metal shield of the receptacle.
24. The connector according to claim 22 or 23, comprising first and second sets of contacts (110, 120) each supported on a respective opposing surface of the connector, wherein:
corresponding contacts in each set are spatially aligned in anti-phase relationship
15 so as to allow the connector to be connected in two opposed orientations to a female receptacle (400) having only a single set of contacts (420) that is compatible with either one of said sets of contacts.
25. The connector according to claim 24, wherein:
in each contact set there is at least one elongated contact that is permitted to
20 make contact with the internal shield of the female receptacle without impairing operability of the connector; and
the at least one elongated contact in each contact set has an active surface that is offset relative to the surface of the planar substrate by a greater distance than the respective active surfaces of other contacts in said set so as to mechanically create a
25 space between the shield and the other contacts of said set when the connector is inserted within the receptacle with the contacts of said set disposed so as not make contact with the contacts in the female receptacle.
26. The connector according to claim 25, wherein the at least one elongated contact is not a data contact.
- 30 27. The connector according to claim 25, wherein the at least one elongated contact is a data contact and said connector further comprises a short circuit prevention device

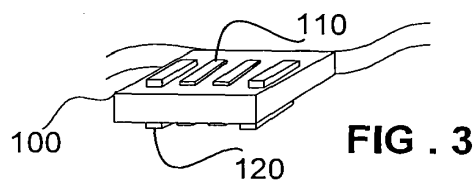
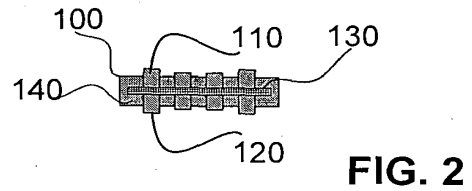
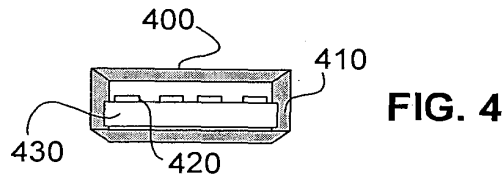
(D1, D2, 675) to prevent an electric short circuit between inactive contacts of the connector and the shield of the receptacle on inserting the connector therein.

28. The connector according to any one of claims 22 to 27, being an FCCS connector.

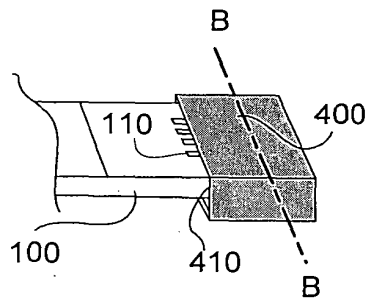
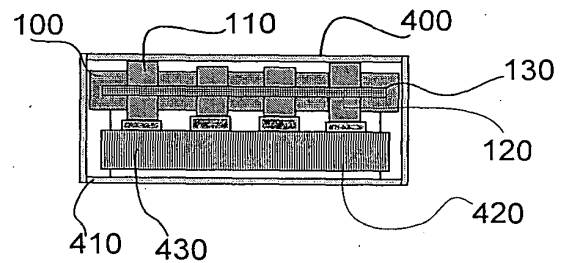
1/4



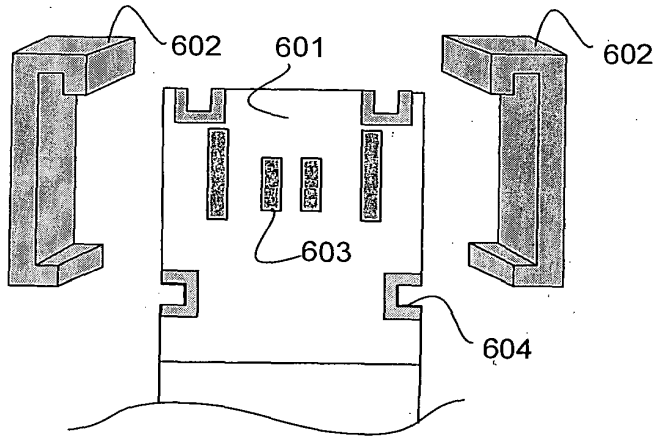
cross sectional on view A-A



cross sectional view on B-B



2/4



600 **FIG. 6**

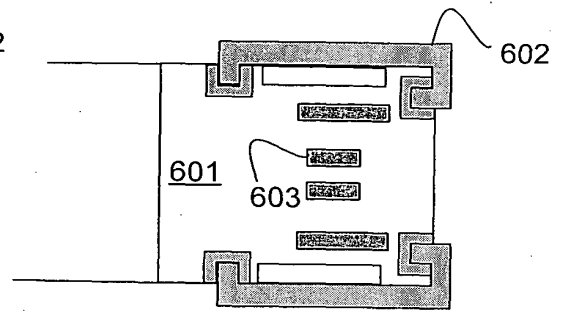


FIG. 7a

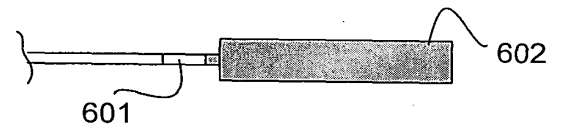


FIG. 7b

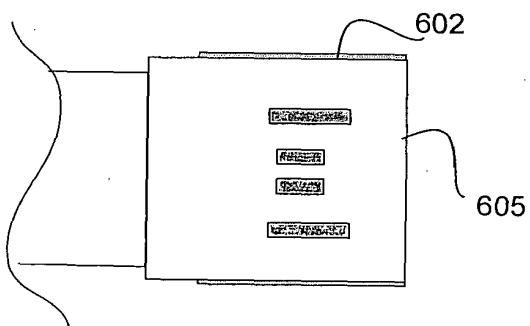


FIG. 8a

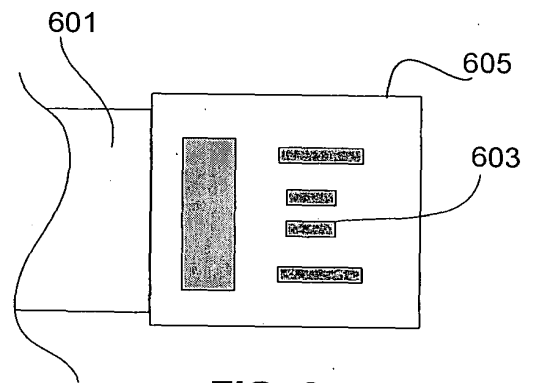


FIG. 9a

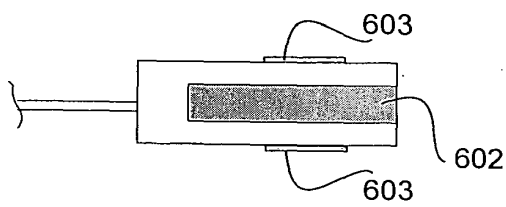


FIG. 8b

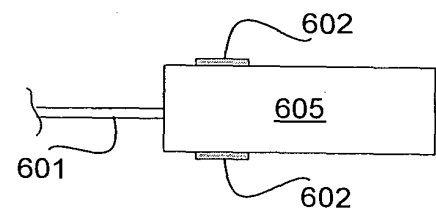
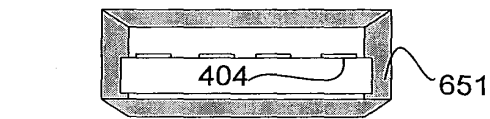


FIG. 9b

3/4



650
FIG. 10a

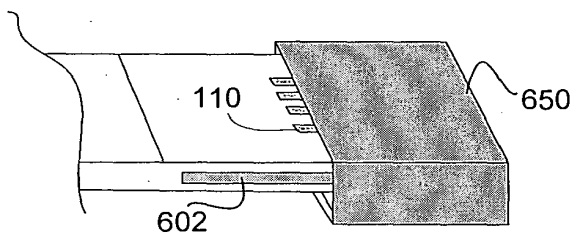


FIG. 10b

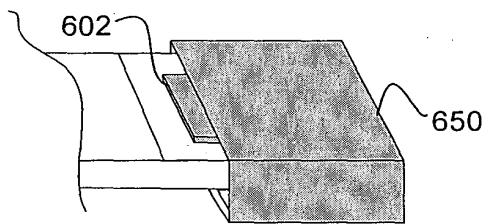


FIG. 10c

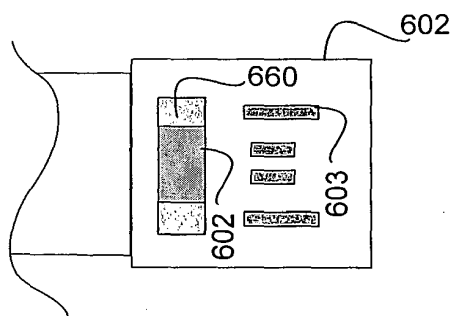


FIG. 11

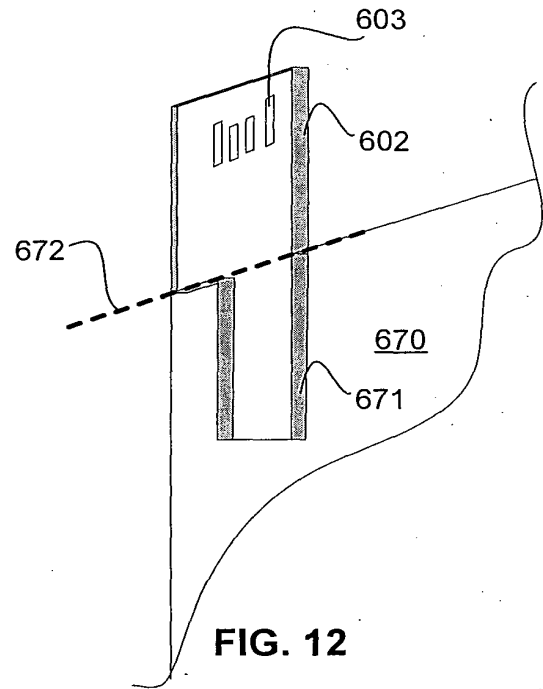


FIG. 12

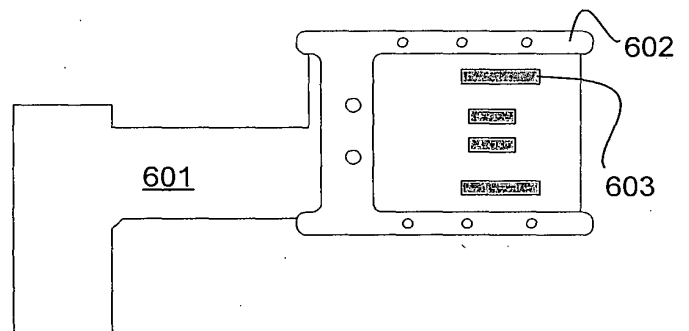


FIG. 13

4/4

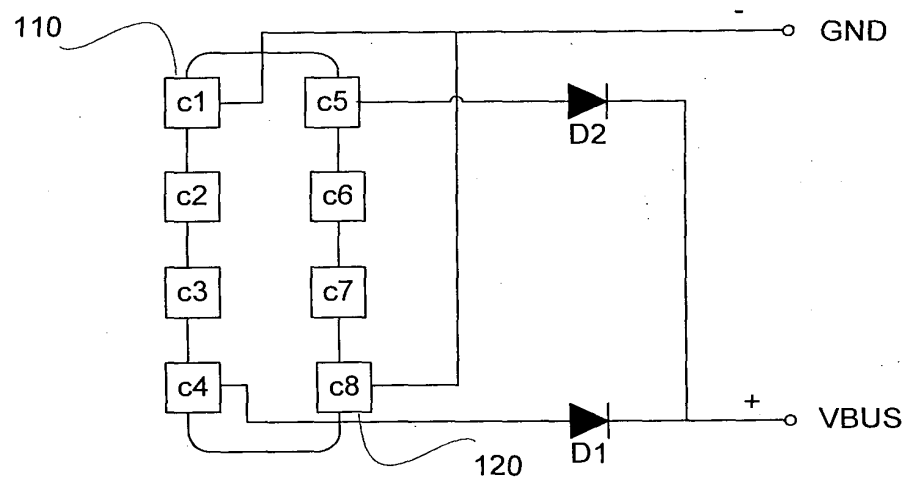


FIG. 14
(PRIOR ART)

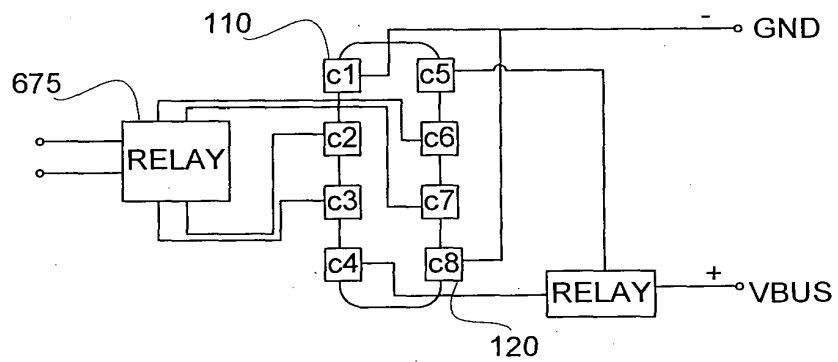


FIG. 15
(PRIOR ART)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
9 October 2008 (09.10.2008)

PCT

(10) International Publication Number
WO 2008/121731 A1

- (51) **International Patent Classification:**
H01R 12/16 (2006.01) *H01R 12/20* (2006.01)
H01R 12/18 (2006.01)
- (21) **International Application Number:**
PCT/US2008/058496
- (22) **International Filing Date:** 27 March 2008 (27.03.2008)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
11/731,810 30 March 2007 (30.03.2007) US
- (71) **Applicant (for all designated States except US):** INTEL CORPORATION [US/US]; 2200 Mission College Boulevard, Santa Clara, California 95052 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** CHENG, Hen [US/US]; 1683 Columbia Dr, Mountain View, California 94040 (US). MADER, Thomas B. [US/US]; 16251 Azalea Way, Los Gatos, California 95032 (US). KO, Jaymun [US/US]; 374 Fallingstar, Irvine, California 92614 (US).
- (74) **Agents:** VINCENT, Lester J. et al.; Blakely Sokoloff Taylor & Zafman, 1279 Oakmead Parkway, Sunnyvale, California 94085 (US).

(81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

[Continued on next page]

(54) **Title:** OPTICAL UNIVERSAL SERIAL BUS (USB)

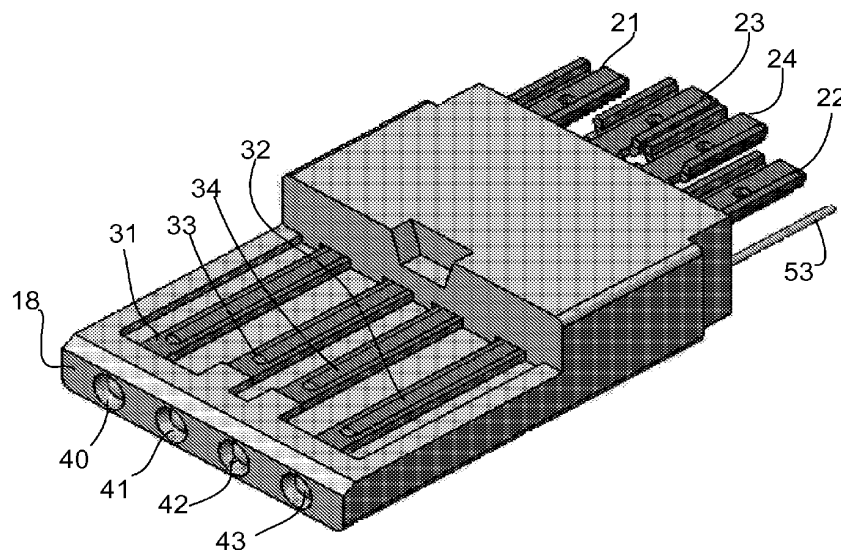


Fig. 3

(57) **Abstract:** Embodiments of the invention are directed to an optical USB (OUSB) to enhance the data rate of USB by adding super-high data rate (e.g. 10Gbps) optical communication on top of its current specification so that backward compatibility is achievable. Mechanical tolerances may be achieved by using embedded lenses to expand a beam emerging from the connector prior to entering its mating connector and using an identical lens in the mating connector to collimate the beam back onto a fiber.

WO 2008/121731 A1



-
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

OPTICAL UNIVERSAL SERIAL BUS (USB)

FIELD OF THE INVENTION

5

Embodiments of the invention relate to the universal serial bus and, more particularly, to a USB including having optical capabilities.

BACKGROUND INFORMATION

10

In many of today's processing systems, such as personal computer (PC) systems, there exist universal serial bus (USB) ports for connecting various USB devices. Some of these USB devices are frequently used by PC users. For example, these USB devices may be printers, compact disk read-only-memory (CD-ROM) drives, CD-ROM Writer
15 (CDRW) drives, digital versatile disk (DVD) drives, cameras, pointing devices (e.g., computer mouse), keyboards, joy-sticks, hard-drives, speakers, etc. Some of these devices use more of the available USB bandwidth than others. For example, a USB CDRW is a high bandwidth device, while human interface devices (HID), such as computer mice, keyboards and joysticks, are low bandwidth devices.

20

Within a USB cable there are typically four shielded wires. Two of the wires may provide power (+5 volts (red) and ground (brown)) and a twisted pair (blue and yellow) for data.

At either end of a USB cable there is a standard sized connector. These connectors each has a different profile designated "A" connectors and "B" connectors. More recently,
25 mini versions of these connectors are appearing to accommodate smaller devices. "A" connectors head "upstream" toward the computer. On the other end, "B" connectors head "downstream" and connect to individual devices. This way, it is almost fool proof to make a wrong connection.

The USB standard allows for low power devices (e.g., mice, memory sticks,
30 keyboards, etc.) to draw their power from their USB connection. Larger devices requiring more power, such as scanners or printers, typically have their own dedicated power supply.

Figure 1 shows a typical USB "A" male connector 10. The cable 12, comprises the

above mentioned four wires and connects to a plastic housing 14. Each of the four wires electrically connects within the housing 14 to one of four contact terminals or pins 16 mounted on the top side of an insulative base 18. The insulative base 18 is wrapped in a metal shield 19. Openings 20 in the metal shield may be provided to lock the connector in
5 place when plugged into a corresponding female connector.

Figure 2 shows a more detailed view of the insulative base 18. As shown, conductive fasteners 21, 22, 23, and 24 are provided at one end to connect to each of the four wires in the cable 12. The outer two fasteners 21 and 22, are for power and the inner two connectors 23 and 24 are for data. On a top side of the insulative base 18 are four pins
10 31, 32, 33, and 34, corresponding to the contacts 21, 22, 23, and 24, respectively. The pins 31-34 within the male connector 10 electrically engage to mating pins within the female connector when plugged in.

Different standards of USB technology have different bandwidths. For instance, Universal Serial Bus Specification, revision 1.1, Sep. 23, 1998 (USB 1.1) devices are
15 capable of operating at 12 Mbits/second (Mbps). Universal Serial Bus Specification, revision 2.0, Apr. 27, 2000 (USB 2.0; also known as high-speed USB) devices are capable of operating at 480 Mbps. However, as technology progresses engineers are constantly striving to increase operating speeds.

20 BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram showing a typical USB “A” male connector;

Figure 2 is a block diagram showing a more detailed view of the insulative base of a USB “A” male connector;

25 Figure 3 is a top view of an insulative base of a USB “A” male connector according to embodiments of the invention;

Figure 4 is a bottom view of an insulative base of a USB “A” male connector according to embodiments of the invention;

30 Figure 5 is a block diagram of a female USB “A” connector according to embodiments of the invention; and

Figure 6 is a cross sectional view of a mated USB “A” connector according to embodiments of the invention.

DETAILED DESCRIPTION

Embodiments of the invention are directed to an optical USB (called OUSB hereafter) to enhance the data rate of USB by adding super-high data rate (e.g. 10Gbps) optical communication on top of its current specification so that backward compatibility is achievable.

A challenge with OUSB is the need to be backward compatible with the legacy USB form factor, which requires relatively large mechanical tolerances. That is, the mechanical tolerance specified by the USB connector is 0.3mm. Optical connectors typically use a butt contact approach. However, optical butt contact may require 10um precision or better. This makes the usual optical connector an unviable solution for USB form factor.

In order to resolve this issue, embodiments disclose an optical beam expanding approach. By expanding the beam size to, for example, 1mm, the 0.3mm mechanical tolerance required by the USB connector may be achieved.

Referring now to Figures 3 and 4, there is shown a top view and a bottom view, respectively, of the insulative base 18 of an OUSB connector according to one embodiment of the invention. Similar to that which is shown and described in Figure 2, conductive fasteners 21, 22, 23, and 24 are provided at one end to connect to each of the four wires in the cable 12. The outer two fasteners 21 and 22, are for power and the inner two connectors 23 and 24 are for data. On a top side of the insulative base 18 are four pins 31, 32, 33, and 34, corresponding to the contacts 21, 22, 23, and 24, respectively. The pins 31-34 within the male connector 10 electrically engage to mating pins within the female connector when plugged in.

In addition, the OUSB connector comprises embedded lenses 40, 41, 42, and 43 on the leading edge of the insulative base 18. These lenses are optically coupled to respective fibers 50, 51, 52, and 53 for providing high speed optical data throughput. While four lenses are shown, this is by way of example and more or fewer may be provided. The lenses 40-43 may be within tapered holes as shown for fiber self-alignment in installation. The tapered holes may have metal inserts for added rigidity. While not shown in Figures 3 and 4, the insulative base 18 would be contained in a plastic housing 14 and include a metal shield 19 as shown in Figure 1.

Figure 5 shows the inside of an "A" connector female OUSB configured to mate

with the connector shown in Figures 3 and 4. As in standard USB, an insulative carrier 50 may comprise four contacts 51, 52, 53, and 54, which may be spring loaded, adapted to make electrical connection with pins 31, 32, 33, and 34, respectively, in the male connector. The four contacts 51, 52, 53, and 54 may be in turn electrically connected to a
5 USB device with contact posts 61, 62, 63, and 64. Four fibers 70, 71, 72, and 73 may enter the female connector and be optically coupled to four embedded lenses 80, 81, 82, and 83, which, when connected, optically couple to the corresponding lenses 40-43 in the male connector.

Figure 6 shows a cut-away side view of a male OUSB connector 88 and female
10 OUSB connector 90 when mated. For simplicity, the electrical connections are not shown in this figure, but may be present as shown in Figures 3-5. The male OUSB connector 88 comprises a plastic base or core 91. The female OUSB connector also comprises a plastic core 92 each surrounded by its own metal shield 93. The plastic cores 91 and 92 may include V-grooves 95 to facilitate alignment of optical fibers 94 and 95.

15 After the plug (male) 90 and receptacle (female) 88 are mated, the lenses 43 and 80 are used to expanded the optical beam to facilitate optical communication. As illustrated, the optical beam from the fiber 94 from the male side may be expanded by lens 43 to, for example, approximately 1 mm. The expanded beam may then be collimated by the embedded lens 80 at the female side couple with fiber 95. Since the embedded lens profile
20 43 and 80 is identical at both sides, optical signals can go either direction. As one can see, expansion of the beam makes it possible to optically couple the fibers 94 and 95 since traditional butt coupling does not work well within the mechanical tolerance confines of USB connectors.

While the above embodiments have been illustrated as USB "A" connectors one
25 skilled in the art will readily recognize that the invention described herein is equally applicable to USB "B" connectors or other USB form factors.

There are many advantages to OUSB. In particular, embodiments maintain all traditional USB electrical connections within the existing USB form factor. Thus, it is fully backward compatibility with the USB 2.0 specification. It allow super-high speed
30 data rate (i.e. 10Gbps) compared to the high speed of USB 2.0 (480Mbps). In addition, optical signal integrity may be maintained in high EMI environments such as factories where traditional electrical connections may experience issues.

The above description of illustrated embodiments of the invention, including what

is described in the Abstract, is not intended to be exhaustive or to limit the invention to the precise forms disclosed. While specific embodiments of, and examples for, the invention are described herein for illustrative purposes, various equivalent modifications are possible within the scope of the invention, as those skilled in the relevant art will recognize.

5 These modifications can be made to the invention in light of the above detailed description. The terms used in the following claims should not be construed to limit the invention to the specific embodiments disclosed in the specification and the claims. Rather, the scope of the invention is to be determined entirely by the following claims, which are to be construed in accordance with established doctrines of claim interpretation.

10

WHAT IS CLAIMED IS:

1. A universal serial bus (USB) connector, comprising:
 - an insulative base having a top surface and a leading edge;
 - 5 a plurality of pins on the top surface of the insulative base to make electrical connections; and
 - at least one embedded lens on the leading edge of the insulative base to provide optical function.
- 10 2. The USB connector as recited in claim 1, further comprising:
 - at least one fiber optically coupled to the at least one embedded lens.
3. The USB connector as recited in claim 2 wherein the embedded lens expands a beam emerging from the fiber.
- 15 4. The USB connector as recited in claim 3 wherein the embedded lens expands the beam to approximately 1 mm.
5. The USB connector as recited in claim 2 wherein the embedded lens collimates a beam
- 20 into the fiber.
6. The USB connector as recited in claim 2 further comprising:
 - four embedded lenses each respectively optically coupled to four fibers.
- 25 7. The USB connector as recited in claim 1, further comprising:
 - a mating connector comprising at least one embedded lens to optically couple to the at least one embedded lens on the leading edge of the insulative base when mated.
8. The USB connector as recited in claim 7 wherein the embedded lens of the mating
- 30 connector is identical to the at least one embedded lens on the leading edge of the insulative base.
9. A method of providing optical function to a USB connector, comprising:

- providing an insulative base having a top surface and a leading edge;
positioning a plurality of pins on the top surface of the insulative base to make
electrical connections; and
embedding at least one lens on the leading edge of the insulative base for optical
5 communication.
10. The method as recited in claim 9 further comprising:
expanding a beam emerging from a fiber with the embedded lens to approximately
1 mm.
- 10 11. The method as recited in claim 9, further comprising:
collimating a beam onto a fiber with the embedded lens.
12. The method as recited in claim 9 further comprising:
15 providing a plurality of embedded lenses on the leading edge of the insulative base.
13. The method as recited in claim 9 further comprising:
plugging the USB connector into a mating connector to optically couple the
embedded lens to a corresponding lens in the mating connector.
- 20 14. The method as recited in claim 9 wherein the embedded lens and the corresponding
lens in the mating connector are identical.
15. An optical universal serial bus (OUSB), comprising:
25 a universal serial bus (USB) connector comprising four electrical connections
mounted to a top surface of an insulative base;
a plurality of embedded lenses on a leading edge of the insulative base;
a plurality of fibers each optically coupled to a respective one of the plurality of
embedded lenses;
30 wherein each lens expands a beam traveling in a first direction from an optical
fiber and collimates a beam traveling in a second direction onto the optical fiber to meet
USB mechanical tolerances.

16. The OUSB as recited in claim 15 wherein the OUSB is backward compatible with USB.
17. The OUSB as recited in claim 15 further comprising four embedded lenses on the
5 leading edge of the insulative base.
18. The OUSB as recited in claim 15 further comprising:
V-grooves in the insulative base to facilitate alignment of the fibers.
- 10 19. The OUSB as recited in claim 15 further comprising;
a mating OUSB connector having identical embedded lenses optically aligned with
the plurality of embedded lenses on a leading edge of the insulative base when mated.
20. The OUSB as recited in claim 15 wherein the beam is expanded to approximately
15 1mm.

1/3

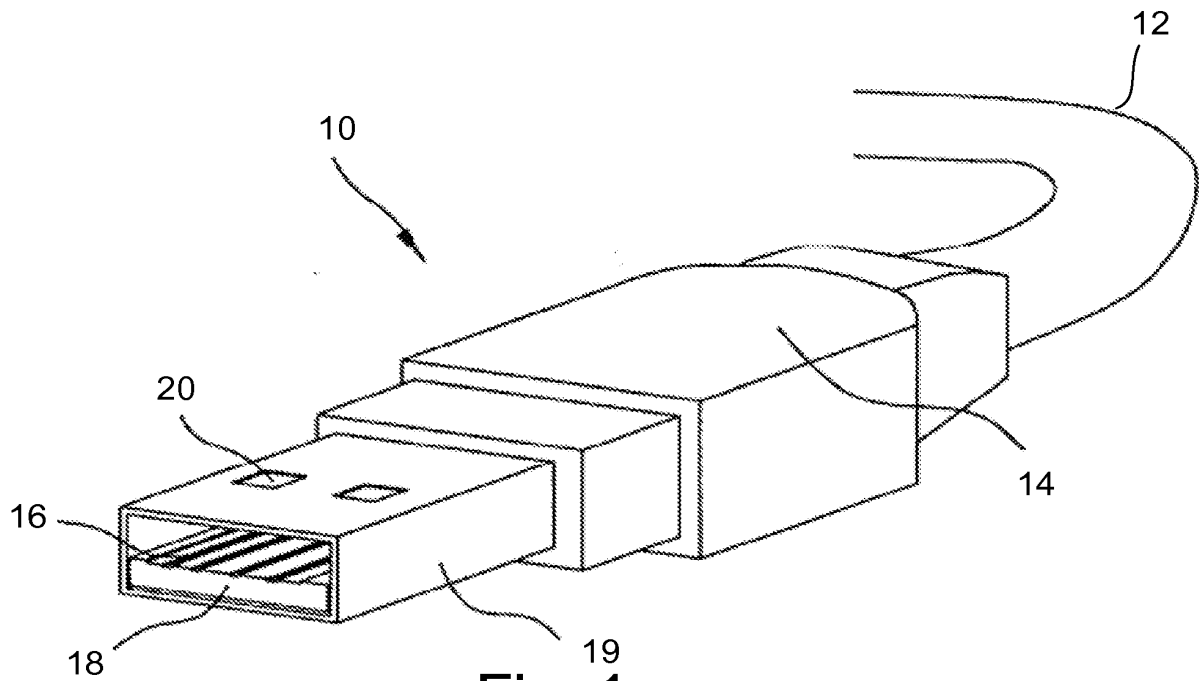


Fig. 1
(Related Art)

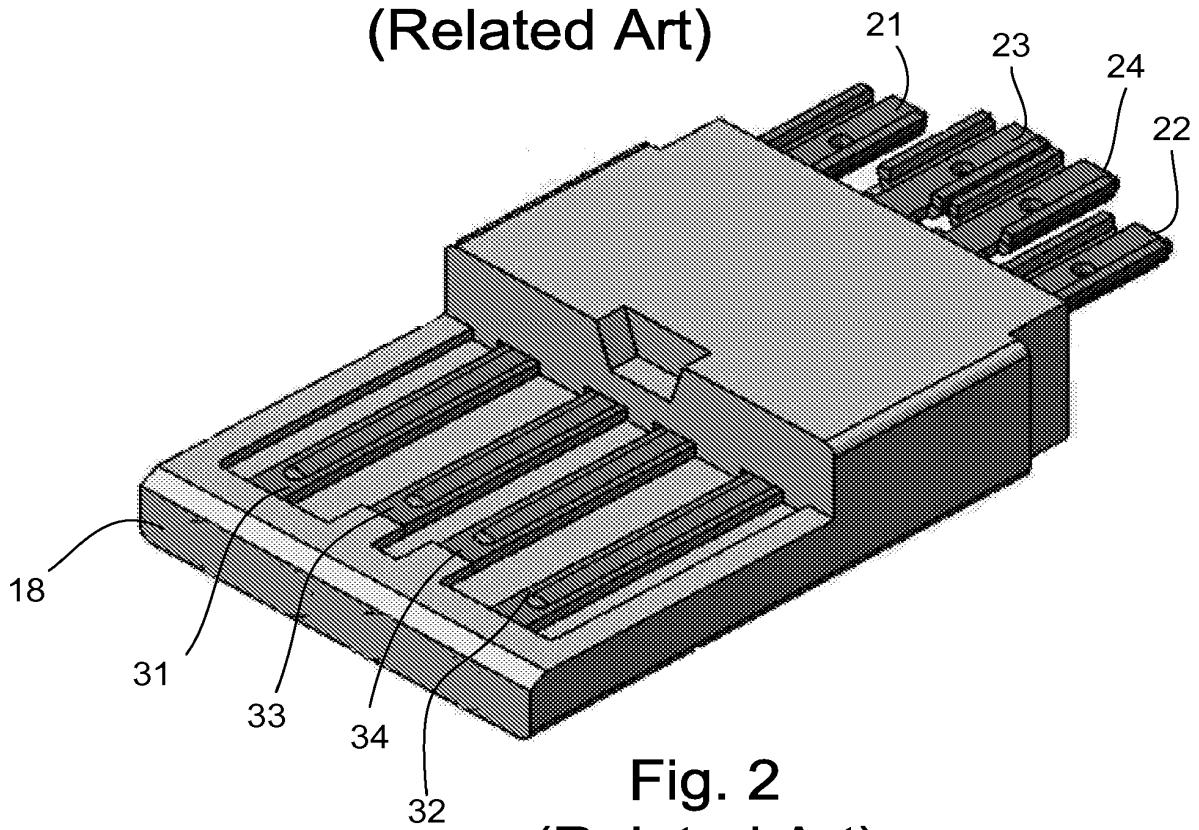
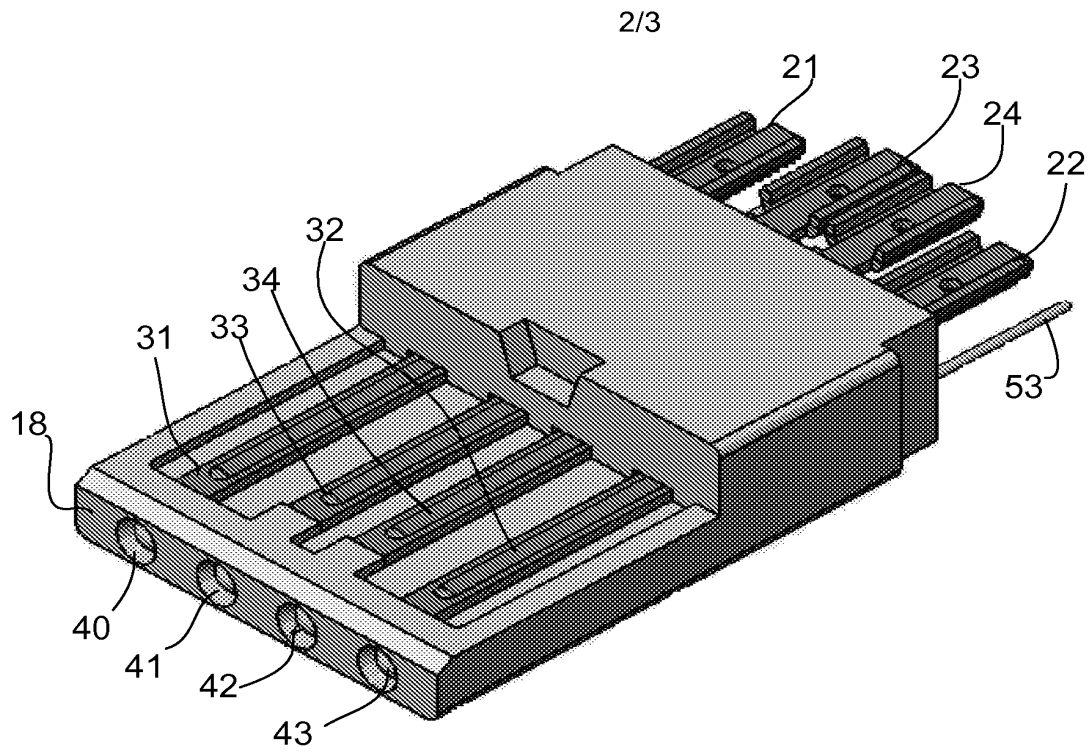
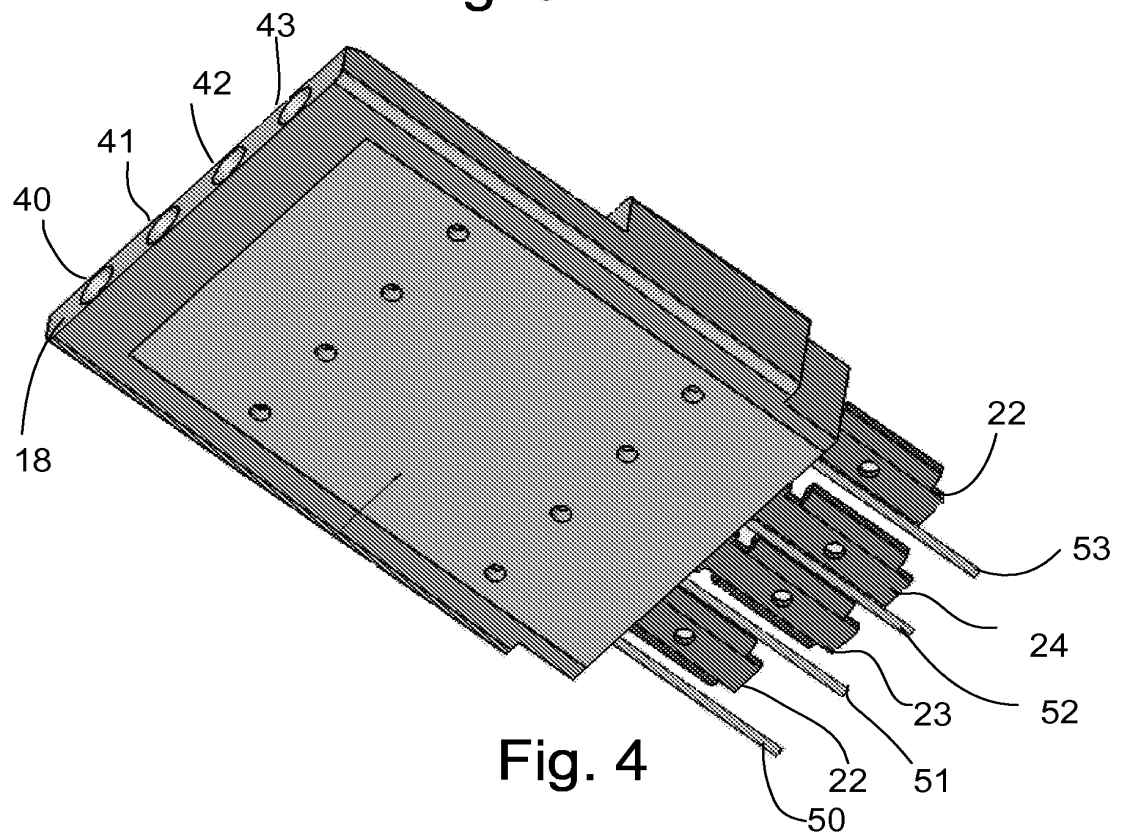


Fig. 2
(Related Art)



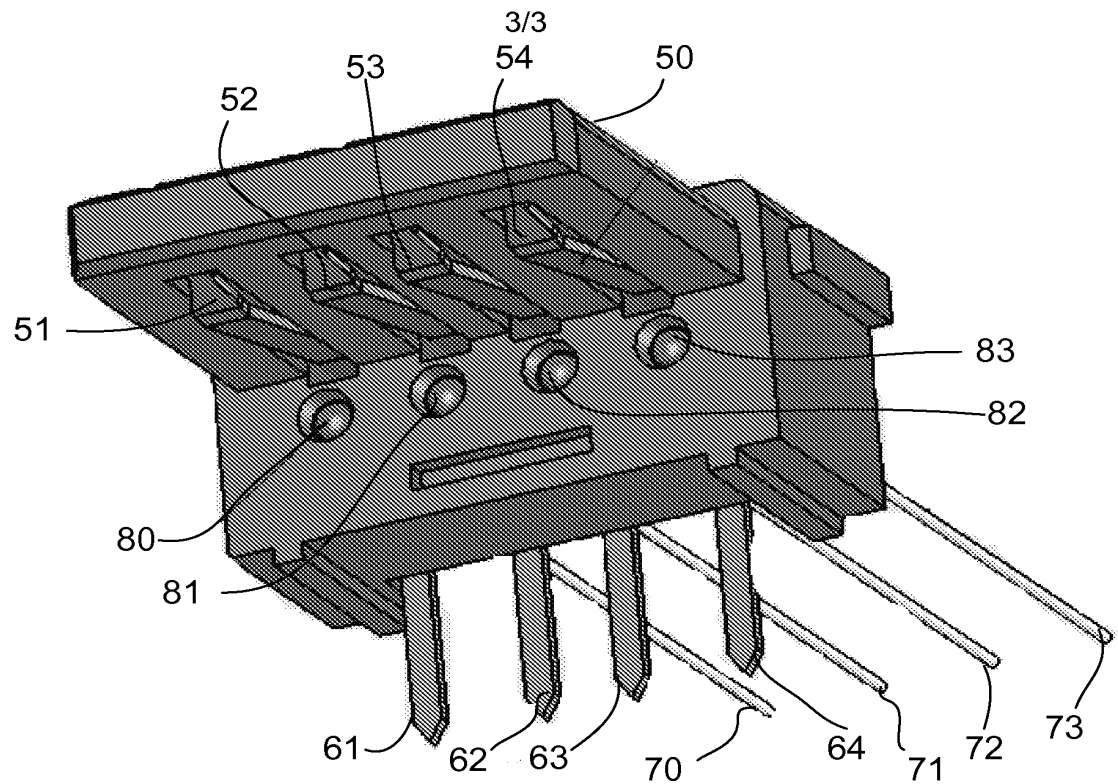


Fig. 5

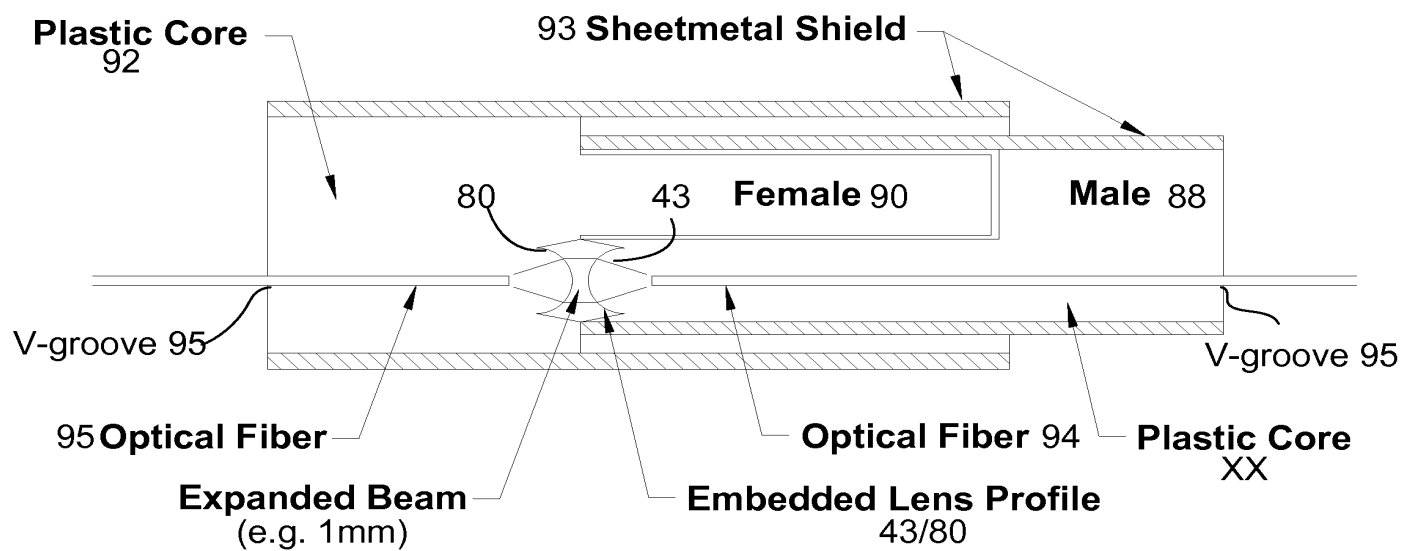


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/058496**A. CLASSIFICATION OF SUBJECT MATTER*****H01R 12/16(2006.01)i, H01R 12/18(2006.01)i, H01R 12/20(2006.01)i***

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)

IPC 8 : H01R

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 since 1975

Japanese Utility models and applications for Utility models since 1975

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

eKIPASS(KIPO internal, Keyword: " optic, usb, connector and the similar terms")

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2004-0042735 A1(ma) 4 March 2004 See abstract; Figs 1-3; [0011]-[0012]	1-20
A	US 6584519 B1(Russell) 24 June 2003 See abstract; Figs 1-3; column 3, line 28-column 4, line 65	1-20
A	US 6964578 B2(Clark et al.) 15 November 2005 See abstract; Figs 2-5; column 4, line 62-column 6, line 59	1-20
A	US 6981887 B1(Mese et al.) 3 January 2006 See abstract; Figs 2-6; column 4, line 28-column 5, line 45	1-20

☐ 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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of 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

18 AUGUST 2008 (18.08.2008)

Date of mailing of the international search report

18 AUGUST 2008 (18.08.2008)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-
gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

KIM, Ki Wan

Telephone No. 82-42-481-5682



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2008/058496

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004-0042735 A1	04.03.2004	DE 20300685 U1 FR 2844108 B3 GB 200300929 A0 GB 2392547 A1 TW 563942 Y US 2004-0042735 AA US 2004-0071410 A1 US 2004-0071410 AA	27.03.2003 13.08.2004 12.02.2003 03.03.2004 21.11.2003 04.03.2004 15.04.2004 15.04.2004
US 6584519 B1	24.06.2003	US 2003-0177294 A1 US 2003-0177294 AA US 6584519 BA US 6954808 BB	18.09.2003 18.09.2003 24.06.2003 11.10.2005
US 6964578 B2	15.11.2005	US 2004-0009697 A1 US 2004-0009697 AA US 6964578 BB	15.01.2004 15.01.2004 15.11.2005
US 6981887 B1	03.01.2006	NONE	

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
22 June 2006 (22.06.2006)

PCT

(10) International Publication Number
WO 2006/065681 A1

(51) International Patent Classification:
H01R 12/20 (2006.01)

Thomas; 4 Stone Ledge Drive, Maumelle, AR 72113 (US). MCCLELLAND, Timothy, R.; 730 Royal Crest Court, Bolingbrook, IL 60440 (US).

(21) International Application Number:

PCT/US2005/044757

(74) Agent: PAULIUS, Thomas, D.; Molex Incorporated, 2222 Wellington Court, Lisle, IL 60532 (US).

(22) International Filing Date:

9 December 2005 (09.12.2005)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/637,013	17 December 2004 (17.12.2004)	US
60/655,673	23 February 2005 (23.02.2005)	US
60/704,698	2 August 2005 (02.08.2005)	US

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(71) Applicant (for all designated States except US): MOLEX INCORPORATED [US/US]; 2222 Wellington Court, Lisle, IL 60532 (US).

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

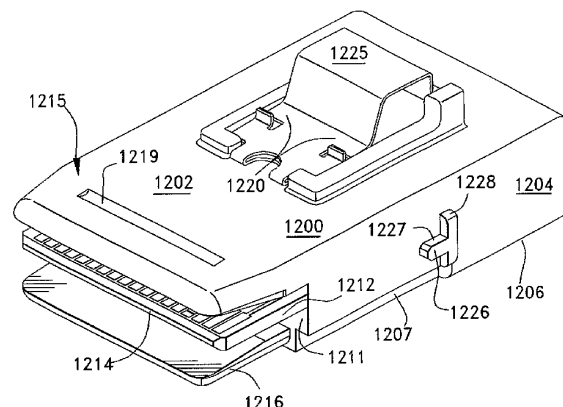
(72) Inventors: NEER, Jay, H.; 6510 Casabella Lane, Boca Raton, FL 33433 (US). BRINKERHOFF, Cleaver; 601 East Kahlar Road, Wilmington, IL 60481 (US). DURAN, Jaime; 4808 South Bishop Street, Chicago, IL 60609 (US). DAWIEDCZYK, Daniel, L.; 2212 Periwinkle Lane, Naperville, IL 60540 (US). LANG, Harold, Keith; 153 West Oriole Trail, Cary, IL 60013 (US). BANAKIS, Emanuel, G.; 1460 North Webster Street, Naperville, IL 60563 (US). REGNIER, Kent, E.; 541 South Grace Street, Lombard, IL 60148 (US). SWENSON, Jennifer; 705 North Hunphrey, Oak Park, IL 60302 (US). HALL,

Published:

— with international search report

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.

(54) Title: PLUG CONNECTOR WITH MATING PROTECTION AND ALIGNMENT MEANS



(57) Abstract: A plug connector (1200, 300) is disclosed that has a body portion and a circuit card (1212, 304) extending forwardly of a mating face (1211, 302) of the connector. The circuit card is protected in place by a pair of protective flanges (1215, 310, 1216, 312) that extend forwardly from the body portion and which flank the circuit card to protect it from stubbing and to provide a first means for aligning the plug connector with the receptacle connector. One or more projections formed on the exterior of the plug connector provide second means (1226, 351) for aligning the plug connector with the receptacle connector.

WO 2006/065681 A1

PLUG CONNECTOR WITH MATING PROTECTION AND ALIGNMENT MEANS

Background Of The Invention

The present invention relates generally to cable connectors, and more particularly to cable connector that mate with circuit board connectors that have a structure which eliminates the need for a shielding cage or guide frame to be utilized with a mating circuit board connector.

It is a common practice in the electronic arts to connect cables to a circuit board by terminating the cables to a connector, typically a plug connector, and then mating the connector to a receptacle connector that is mounted on a circuit board. A well-known problem with connecting cables to circuit board-mounted connectors is the tendency for the cable's weight and movement to loosen the points of attachment of the receptacle connector to the circuit board, thereby breaking signal pathways and causing the circuit board to fail.

This may be prevented by the use of a large guide frame that is mounted to the circuit board to enclose the receptacle connector and which defines an opening into which a plug or similar connector may be inserted. However, such guide frames are large and take up valuable space on the circuit board that could be used for additional circuits or terminations. Additionally, such guide frames are typically die cast and are prone to breakage when dropped.

Problems also arise when mating such plug connectors to their associated receptacle connectors in that in small, confined spaces, it is difficult to orient the plug for proper mating and in small spaces debris and contaminants may easily come into contact with the receptacle connector terminals.

Connector receptacle strain is also a problem and may be caused by the weight, size and movement of the cable(s). Still further, a connector plug and its mating connector receptacle can sometimes be misaligned with respect to each other, needlessly complicating an assembly process and in high-speed connectors, portions of terminals are usually exposed to the exterior of the connector housing, where the terminals may become contaminated. Accordingly, a plug connector which includes means integrated therewith for aligning itself to mate with an opposing connector without occupying much space on a circuit board is desirable.

Accordingly, the present invention is directed to a plug connector that overcomes the aforementioned disadvantages and also provides the aforementioned desired benefits.

Summary Of The Invention

Accordingly, it is a general object of the present invention to provide a plug connector that is guided into engagement with an opposing connector by way of a guide member.

5 Another object of the present invention is to provide a plug connector that mates to a surface mount receptacle connector, the receptacle connector including a recess disposed along a bottom face thereof and the plug connector having at least one projecting flange that assists in aligning the plug connector with the receptacle connector and which fits into the receptacle connector recess.

10 Another object of the present invention is to provide a plug connector for mating with the aforementioned receptacle connector, the plug connector including means for engaging a guide member which aligns and guides the plug connector into mating engagement with the receptacle connector, the plug connector having a mating projection that takes the form of a circuit card and the plug connector further including a pair of protective flanges that are spaced apart from the circuit card and which extend outwardly above and below the circuit card, the plug connector
15 flanges covering opposing surfaces of the receptacle connector and protecting portions of terminals of the receptacle connector which are exposed, from contact by exterior materials, such as contaminants.

Yet a further object of the present invention is to provide a plug connector for use with the aforementioned receptacle connector and guide member, the plug connector including a
20 mating face with forwardly projecting mating blade that fits into a corresponding slot in the receptacle connector, the plug connector further including at least one projecting tab that extends above and forward of the plug connector mating face, the tab having a recess that receives a corresponding prong, or tab, of the guide member therein and the plug connector tab extending above the housing of the receptacle connector when mated thereto.

25 A still further object of the present invention is to provide a connector for mating with a receptacle connector mounted to a circuit board, the receptacle connector including a widthwise mating slot disposed therein, the receptacle connector mating slot including a plurality of conductive terminals that are supported in place therein by way of other, exterior slots that receive the terminals, the terminals extending into the mating slot of the receptacle connector,
30 the connector including a circuit card projecting therefrom and received in the receptacle connector mating slot when the two connectors are mated together, the connector further including a body with at least one flange extending therefrom over the circuit card, the flange

extending over portions of at least one set of the terminals of the receptacle connector, the flange including an angled lead-in configuration for guiding the connector into alignment with the receptacle connector.

Yet still another object of the present invention is to provide a plug connector that mates
5 with a receptacle connector mounted to a circuit board and which first passes through a guide positioned on the circuit board ahead of the receptacle connector, the plug connector having one or more stops in the form of lugs extending out from the plug connector body, the lugs engaging corresponding means formed on the guide to limit the insertion travel of the plug connector into the receptacle connector, and the lugs assisting in aligning the mating blade portion of the
10 connector with the receptacle connector.

The present invention accomplishes these and other objects and aspects by virtue of its structure, which in one principle aspect includes a plug connector with a housing that is insertable into a guide member associated with the receptacle connector and it directs and aligns the plug connector plug with the receptacle connector.

15 The receptacle connector utilized with the present invention will usually have a body, with a card-receiving slot that extends width-wise of the connector body and conductive terminals are inserted into the connector body and contact portions thereof extend into the slot. The plug connectors of the present invention include a circuit card, in their preferred embodiments as a mating blade portion, and the circuit card projects from a forward face of the
20 plug connector in order to extend into the slot of the receptacle connector. The receptacle connector may include a recess disposed on its underside, between mounting legs thereof and beneath the card-receiving slot. The plug connector preferably includes a lower, or first flange that extends forwardly from the forward face. This flange is received within the recess and so serves as a guide for properly mating the plug connector to the receptacle connector. The lower
25 flange also preferably has a length sufficient so that it extends at least partly over some of the terminals exposed along a bottom surface of the receptacle connector and serves to protect them from debris and contamination accumulation. The lower flange also preferably has a width that is less than that of the circuit card so the lower flange will not encounter any interference when entering the lower recess defined between the receptacle connector and the circuit board.

30 In another principal aspect of the present invention, the plug connector includes a housing with a defined mating face from which the circuit card and the first flange project. A second flange may be provided, and this second flange is spaced apart from the first flange and

the circuit card so that the two flanges flank the circuit card. In the usual application of the invention, this second flange will serve as a top flange to the plug connector while the first flange will serve as a lower, or bottom, flange of the plug connector. The second flange also extends forwardly of the mating face and preferably has a length and width sufficient to cover the circuit card. The first flange initially serves as a primary guide to guide the plug connector into mating alignment with the receptacle connector and as such it may include angled lead-in edges that may contact the receptacle connector guide. As the plug connector is pushed further forwardly and the circuit card begins to contact the receptacle connector card-receiving slot, the second flange will cover portions of the exposed terminals on the upper surface of the receptacle connector.

The guide member that is used with the receptacle connector may also include an extension in the form of a press, or spring, arm that extends preferably toward and over the top surface of the receptacle connector plate thereof. A slot, or channel, may be formed on the top surface of the plug connector second flange and this channel, receives a portion of the guide member press arm, preferably a detent or the like so that an audible or tactile click may be heard or felt when the plug connector properly mated to the receptacle connector. The channel in the top flange assist in keeping the top flange in place over a portion of the top surface of the receptacle connector.

In yet another principal aspect of the present invention, the plug connector body may include one or more features for effecting a secondary alignment between the plug connector and the receptacle connector. These features may take the form of projections, or lugs that are disposed on the outer side surfaces of the plug connector body. In the preferred embodiment., these lugs have a T-shape with the leg of each such T extending lengthwise or parallel to a longitudinal axis of the plug connector body and the top of each T extending transverse to the longitudinal axis of the plug connector body. These T-shaped lugs engage corresponding slots formed in the leading edges of the receptacle connector guide member and also serve as stop members that limit the forward travel of the plug connector into the guide member and receptacle connector.

The plug connectors of the present invention may be provided with a latch mechanism, which uses a simple "push" action to latch and unlatch the plug connector from engagement with the receptacle connector guide member. The plug connector body, or housing, is preferably provided with a latch frame in the top surface of the plug connector body. This frame defines a

space that is occupied by a metal latch mechanism. the frame may include one or more undercuts, into which portions of the latch mechanism fit. In the preferred embodiment, the latch member is formed from a metal plate which is folded upon itself along a leading edge to define an anchor, or base portion and a latch portion, the base portion fitting into the latch frame and skiving into the housing material to maintain it in place. The latch portion has one or more engagement tabs that are formed thereon and a press surface for pressing the latch portion down.

In an alternate embodiment, the plug connector may be used in a vertical orientation in association with a vertical receptacle connector, in which instance the first and second flanges are not considered as top and bottom flanges, but may be considered as either front and back or left and right flanges.

These and other objects, features and advantages of the present invention will be clearly understood through a consideration of the following detailed description.

Brief Description Of The Drawings

The invention, together with its objects and the advantage thereof, may be best understood by reference to the following description taken in conjunction with the accompanying drawings, in which like reference numerals identify like elements in the figures and in which:

FIG. 1 is an exploded perspective view of an electronics assembly that utilizes a connector guide member in association with a circuit board mounted receptacle connector to align a first embodiment of a plug connector constructed in accordance with the principles of the present invention to the receptacle connector;

FIG. 2 is a perspective view taken from the rear of the receptacle connector and guide member of FIG. 1, illustrating the environment in which the first embodiment of the invention is utilized;

FIG. 3 is the same view shown in FIG. 2, but with the first embodiment plug connector inserted into the guide member and engaged with both the receptacle connector and guide member;

FIG. 4 is an enlarged perspective view taken from the front of the plug connector of FIG. 1 spaced apart from the guide member;

FIG. 5 is an enlarged perspective view taken from the rear of the plug connector of FIG. 4 after the plug connector has been inserted into the guide member;

FIG. 6 is a sectional view of FIG. 5 taken along lines 6-6 thereof;

FIG. 7 is a perspective view of an alternate embodiment of a vertical guide member that is used in conjunction with a vertical, surface-mounted receptacle connector;

FIG. 8 is the same view as FIG. 7, but taken from the opposite side thereof;

5 FIG. 9 is a perspective view of a receptacle connector and associated shroud, or guide member with a second embodiment of a plug connector constructed in accordance with the principles of the present invention spaced apart from and in alignment with the receptacle connector:

10 FIG. 10 is the same view as FIG. 9, but with the plug connector partially inserted into the shroud;

FIG. 11 is the same view as FIG. 10, but with the plug connector fully engaged in the shroud and in mating engagement with the receptacle connector;

FIG. 12 is a perspective view of the plug connector of FIG. 9, taken from the front thereof;

15 FIG. 13 is a sectional view of FIG. 9, taken generally along lines 13-13 thereof, but with the plug connector in place within the shroud and mated to the circuit board connector

FIG. 14 is a perspective view of a third embodiment of a plug connector constructed in accordance with the principles of the present invention;

FIG. 15 is a side view of the left side of the plug connector of FIG. 14;

20 FIG. 16 is a sectional view of the plug connector of FIG. 14, taken along lines 16-16 thereof;

FIG. 17 is the same view as FIG. 14, but with the cables removed for clarity and with the latch member shown removed and spaced away from its retaining frame on the plug connector housing;

25 FIG. 18 is a front elevational view of the plug connector of FIG. 14;

FIG. 19 is the same view as FIG. 16, but with the latch member removed for clarity; and,

FIG. 20 is a rear elevational view of the plug connector of FIG. 14.

Detailed Description Of The Preferred Embodiments

30 FIG. 1 illustrates an exploded view of an electronic assembly 2 used to exchange electrical signals between conductive traces 6 of a circuit board, or other substrate, 4 and electrical conductors in a cable 101. In FIG. 1, the electronic assembly 2 shown includes a

circuit board 4 to which electronic components such as integrated circuits, resistors, capacitors inductors and the like can be mounted. As is well-known, electronic components mounted to circuit boards are interconnected by one or more electrically conductive traces 6, at least some of which are located on at least a surface of the substrate 4. Electrical signals may be transmitted
5 through the conductive traces 6 by way of a receptacle connector 8 that is mounted to the substrate 4 and which mates with an opposing cable connector.

FIG. 1 shows the receptacle connector 8 attached to the circuit board 4 using either mounting posts, screws or soldered into place as shown, all of which are well-known in the art. The receptacle connector 8 has two opposing sides 10 and 12, a top 14, a bottom 15, a front 16
10 and a back 18. The receptacle connector 8 is constructed and arranged to maintain the spacing of several electrical front-side accessible contacts 20, each of which is electrically coupled to a corresponding conductive trace 6 on the circuit board 4.

Electrical and mechanical connection to the front-side 16 accessible contacts 20 in the receptacle connector 8 is made by extending a mating connector of the plug type 100 into contact
15 with the receptacle connector 8. The plug connector 100 has its own set of conductive contacts that are preferably arranged along a mating blade and these contacts mate with the receptacle connector contacts 20. In such an assembly shown in FIGS. 1-6, the plug connector is at least partially guided into place by way of a guide member 24 associated with the receptacle
connector 8, and this guide member 24 is preferably mounted to the circuit board 4 in a location
20 that is forward of and spaced apart from the receptacle connector 8. In a preferred embodiment, the guide member 24 is has a general inverted U-shape and is formed as a hood or shield, that is attached to the circuit board 4 by suitable means, such as soldering. The guide member 24 defines a hollow channel 80 through which the plug connector 100 can extend and engage the
mating receptacle connector 8.

As shown in FIGS. 1-3, the connector guide member 24 preferably includes at least two
25 planar sides 26 and 28. One planar side 26 has a top edge 30 and a bottom edge 32 and the second side 28 also has a top edge 34 and a bottom edge 36. Each planar side 26 and 28 further includes a front edge and a back edge. The first side 26 has a front edge 38 and a back edge 42. The second side 28 has a front edge 40 and a back edge 44. Two mounting posts 70 (FIG. 4) are
30 preferably formed in the guide member along the bottoms of the sides and these posts may be cylindrical or may be stamped as part of the guide member itself. No matter what their structure, the posts 70 extend downwardly from the sides 26 and 28 and are received in mounting holes 25

formed in the circuit board 4. They may be used to solder the guide member in place on the circuit board 4.

As seen in FIGS. 3 & 4, the opposing first and second sides 26 and 28 of the guide member preferably have substantially equal heights 46 between the top and bottom edges and a substantially equal width 48 between the front and back edges of each side. As seen in FIG. 1, the sides 26 and 28 are substantially upright and extend at generally right angles to the planar top 52. Although the preferred embodiment of the guide member 24 is stamped from a single piece of sheet metal, for purposes of this disclosure, the top 52 and the two sides 26 and 28 may also be joined to each other at common edges. The top 52 has a first side edge 54 shown at its right when viewed from the front as in FIG. 1 and a second side edge 56 shown at its left. The top 52 also has a front edge 58 and a rear edge 60.

Typically, the guide member 24 will be stamped and formed from a metal blank by which there is formed an extension of the guide member which takes the form of a tab or spring arm 64 that extends rearwardly. In the drawings, it is shown as extending in a cantilevered fashion, and, it is preferably formed at a slight downward angle that creates a bias or preload in the arm 64. This bias forces a plug engagement portion, shown as ridge or catch 62, located near the distal end of the spring arm 64, into engagement with a corresponding slot or recess 102 that is formed in a corresponding portion of the plug connector.

FIG. 2 is a rear perspective view of the connector receptacle 8 and the relative position of the guide member 24, with respect to the connector plug 8. As shown in FIG. 2, the guide member 24 is mounted to the circuit board 4 so that the guide member 24 is located in a spaced apart fashion from the connector receptacle, i.e., not in contact with it, and in front of the mating face 16 of the receptacle connector 8. FIG. 2 also shows the connective traces 6 on the circuit board 4 and their connection to the electrical contacts 20 of the receptacle connector 8. FIG. 2 also illustrates shows side locking latch or engagement tabs 53 that are formed in the side plates 28 by stamping. These engagement tabs 53 extend inwardly, i.e. into the interior of the channel 80 of the guide member 24 they are sized, shaped and arranged to frictionally contact the sidewalls 110 of the plug connector 100 when the plug 100 is inserted into the guide member 24 and engaged with the receptacle connector 8. As shown in FIG. 1, the plug connector may be provided with openings 57 in its sidewalls into which the guide member engagement tabs 55 catch.

FIG. 3 illustrates a rear perspective view of the electronic assembly of FIG. 1 and

showing the circuit board 4, the rear 18 of the receptacle connector 8, the contacts 20 of which establish electrical connections between the board traces 6 and the plug connector wires 101 by way of the plug connector 100 that is installed and latched into place. In FIG. 3, the plug connector 100 of the present invention is shown extending through the guide member 24 until the spring arm catch 62 engages the slot 102 in the top of the plug connector 100. As shown in FIG. 3, this catch is located near the distal end, i.e. the end furthest from the point where the spring arm 64 extends away from the rear edge 60 of the top 52 of the guide member 24. This catch-slot engagement arrangement provides not only an audible engagement "click", but also a tactile click that an assembler can hear and feel when mating the plug connector 100 to the receptacle connector 8.

FIG. 4 shows a front perspective view of the guide member 24 and the relative location of a connector 100 prior to its insertion into the guide member 24. FIG. 4 omits the depiction of the circuit board 4 for clarity. The plug connector 100 is clearly shown to have a connector latch slot 102, cut, molded or otherwise formed in the body of the connector 100 and positioned to accept the catch 62 when the connector 100 is fully engaged with the receptacle connector. It can be seen that the plug connector includes a mating portion, which preferably takes the form of an edge card 120 with a leading edge that extends out from a forward mating face 121 of the plug connector 100.

The edge card 120 has a plurality of conductive traces 125 disposed along its leading edge which are intended to mate with the contacts 20 of the receptacle connector when the plug connector 100 is inserted into the receptacle connector 8. The plug connector housing may also include an extension portion 130 that extends forward from the mating face 121 and over the edge card 120. This extension portion 130 is illustrated as a first flange that also extends widthwise for at least the full width of the edge card 120, and preferably has a width greater than that of the edge card 120. This first flange serves to firstly protect the edge card 120 from stubbing and extends over a portion of the top of the receptacle connector 8 to cover portions of the exposed terminals supported therein. It also provides a support for the recess 102.

It can also be seen best in FIG. 4, that the plug connector flange has angled sides 131 which provide lead in surfaces so that the plug connector 100 may be easily guided into alignment with the receptacle connector by the guide member. The first flange has a length that preferably extends forwardly of the mating face 121 which is greater than the length which the edge card 120 projects from the mating face 121 in order to prevent the contacts on the edge

card 120 from contacting the guide member 24 or anything other than the receptacle connector 8.

FIG. 4 also shows a side locking latch 55 formed in one side 28 of the guide member 24. In this embodiment, the side locking latch 55 is formed simply by stamping the metal from which the guide member 24 is formed such that a small tab is formed in the side that extends
5 toward the opposite side 26 and which engages a corresponding side detent 57 formed into a corresponding side of the plug connector 100. When the plug connector 100 is fully engaged with the opposing receptacle connector, the side locking latch 55 (which preferably is formed on both sides 26, 28 of the guide member 24), will engage corresponding detents 57 and “latch” the
10 plug connector 100 in engagement with the receptacle connector 8. The latching in this embodiment is accomplished by the guide member 24 and not the receptacle connector 8 so that strain on the assembly induced by the wires 101 is absorbed by the guide member 24 and not by the receptacle connector 8. In addition, any misalignment of the contacts in the plug connector 100 and the receptacle connector 8 is minimized by the plug-to-receptacle alignment function performed by this aspect of the guide member 24.

FIG. 5 is a rear perspective view of the connector 100, fully inserted into the guide member 24. In this figure, the guide member catch 62 is in interlocking engagement with the slot 102 in the connector 100. A deflection or “bias” in the spring arm 64 urges the catch 62
15 downwardly into the engagement slot 102 when the plug connector 100 is fully inserted into the guide member 24. Similarly, the side locking latch 55 (one shown on one side) because it is bent inwardly, may extend into the plug connector recesses 57 to preventing the plug connector 100
20 from being removed without any significant pull out force. When the plug connector 100 is so connected to the receptacle connector 8, the guide member also provides strain relief and conductor alignment.

FIG. 6 is a partial cutaway view of the connector 100 when installed into the connector alignment guide 24. In this figure, the interlocking engagement of the plug engagement latch 62
25 is clearly shown on the right-hand side of the drawing. It can be seen that the engagement latch 62, which is biased downwardly and into the connector slot 102, acts to keep the connector 100 within the alignment guide 24. Also shown are two mounting posts 70 that are connected to the bottom edges 32 of the connector guide sides 26 and 28 and which are used to electrically and
30 mechanically mount the alignment guide 24 to a circuit board or other substrate 4.

Although illustrated in FIGS. 1-6 as being disposed on the top of the plug connector 100, the flange 130 may also be oriented on the bottom of the plug connector mating face 121. In this

orientation, the flange will still serve a protective function against stubbing and will also provide an alignment feature in that it will be received within the recess that is formed along the bottom of the receptacle connector 8 beneath the edge card-receiving slot of the receptacle connector 8.

FIGS. 7 & 8 illustrate another embodiment 200 of a plug connector constructed in accordance with the principles of the present invention and which is intended for a vertical use on a circuit board. As shown in the Figures, the receptacle connector 201 is one that is surface-mounted in a vertical format to a circuit board 202. The connector 201 has an insulative housing 204 and supports a plurality of conductive terminals 206. The terminals 206 have tail portions 208 that are soldered to pads or traces on the surface of the circuit board 202. A conductive guide member 210 is provided for use with the connector 202 and it can be seen that the guide member 210 may have a general U-shape with a top plate 212 that has two side plates 213 that extend therefrom transversely. These three plates cooperatively define a channel 215 which extends partially around and above the receptacle connector 201. The top plate 212 of the guide member is slotted and has a recess 218 into which a catch member 220 extends. This catch member has a bend 221 formed in it that preferably engages a slot (not shown) on the plug connector housing 250 in the same manner as shown for the first embodiment.

In this embodiment, the plug connector 240 is for the most part merely oriented in a vertical direction and has an insulative housing 250 from which an edge card and a first flange extend. The first flange extends partially over the exposed terminals of the receptacle connector 201 and it has a slot that is intended to engage the catch member 220 of the vertical guide member.

FIG. 9 illustrates another electronic assembly in which another embodiment of a plug connector constructed in accordance with the principles of the present invention the invention is illustrated. In this assembly a shroud (or guide member) 1100 is shown as having a top wall 1102 that interconnects two spaced-apart sidewalls 1104, 1105. The shroud 1100 has a general inverted U-shape, when viewed from an end, and is placed on a circuit board 1110 spaced apart from a receptacle connector 1150 that is mounted to the circuit board 1110. The receptacle connector 1105 is similar in shape and form to the receptacle connector 8 described and shown in FIGS. 1-6 above and includes an opening or recess along its bottom face underneath its card-receiving slot and beneath the bottom surface of the receptacle connector 1105. The slot receives the leading edge of the circuit card that is used in the plug connector 1200 as the blade portion thereof. The shroud 1100 provides a hollow channel 1106 that may guide the plug

connector 1200 into engagement with the circuit board connector 1150.

The shroud 1100 also serves to retain the plug connector 1200 in place after mating. In this regard, the shroud 1100 includes an elongated extension 1117 that extends forwardly of the top wall 1102 of the shroud and it may further preferably include one or more alignment slots 1135 that are disposed in the sidewalls 1104, 1105 of the shroud 1100 and which extend longitudinally forwardly, the purpose of which shall be explained in more detail below. Additional means 1119 for guiding the plug connector 1200 may also be provided on the shroud 1100, and may take the form of tabs 1118 that are bent inwardly and extend for a predetermined distance from the sidewalls 1104, 1105.

The plug connector 1200, as best illustrated in FIGS. 13 & 15, has a generally polygonal structure, and is shown in the drawings as generally a solid rectangle with a top surface 1202, two side walls 1204, 1205, a bottom surface 1206 and a rear surface 1208. Cables will usually exit from the rear surface 1208, but they have been omitted from the drawings for clarity. The front end 1210 of the connector defines a mating end of the plug connector 1200 and in applications such as shown in FIGS. 9-13, the plug connector 1200 preferably includes a forward mating face 1211 includes a forwardly projecting mating blade 1212, typically in the form of a leading edge of a circuit card 1214. The top surface 1202 (and in the drawings, bottom surface 1206) may have an extension 1215 in the form of a first flange that extends forwardly from the forward face 1211, and which is located above and spaced apart from the circuit card 1212. Another extension is also preferably present in this embodiment, and as shown best in FIGS. 12 & 13, this extension takes the form of a second flange 1216 that likewise extends forwardly from the forward face 1211 and which is located below and spaced apart from the circuit card 1214 and the first flange 1215. In this type of arrangement, the two flanges 1215, 1216 may be considered as "flanking" the circuit card 1212.

The shroud press tab 1117 is bent downwardly to impart a slight bias to it so that it will slidably or abuttingly contact the top surface 1202 of the mating connector 1200, and in particular, the top extension 1215 thereof. This type of engagement is shown best in FIG. 13, and the top flange 1214 may be provided with a transverse slot or recess 1214, that is spaced a specific distance from the leading end of the top flange 1215 so that it will engage the detent portion of the shroud press tab 1117. This engagement serves to assist in retention of the plug connector 1200 in mating engagement with the receptacle connector 1150 and also assist the operator in knowing the engagement between the two connectors 1200, 1150 is complete. The

press tab 1117 with its downward bias will “click” into the recess 1214 in both an audible and tactile manner so the operator will not only feel the engagement, but also “hear” the engagement.

The shroud 100 may further include one or more slots or recesses 1130 disposed in its top wall 102 that are engaged by means such as lugs, 1220 that are preferably formed on the plug connector 200 as part of a latching mechanism. These lugs 220 may be moved in and out of engagement with the slots 1130 by means of a push-type button 1225, shown as formed from an extent of sheet metal that is bent upon itself along a line to form distinct base or anchor and actuating portions, as explained in greater detail below.

As mentioned above, the shroud 1100 may also include a pair of alignment slots 1135 that are formed in the shroud sidewalls 1104, 1105 and preferably along the outwardly facing edges thereof. These notches 1135 engage corresponding structure, shown as lugs 1226 that are formed on the exterior of the plug connector housing 1200. These lugs 1226 have an overall T-shape when viewed from the side, with a center leg 1227 that is received within the corresponding shroud alignment slot 1135 and two other legs that form a base 1228 that is perpendicular to the center leg 1227. The base 1228 serves as a stop when it abuts the edge of the sidewalls 1104, 1105. With the present invention, the tabs 1118 of the shroud 100 are received in notches 1207 that extend lengthwise along the plug connector exterior and these tabs 1118 and notches 1207 serve to first orient and position the plug connector 1200 in the interior of the shroud 1100, and the notches 1135 and lugs 1226 cooperate to secondly orient the circuit card 1212 of the plug connector 1200 in opposition to card-receiving slot of the receptacle connector 1150.

FIGS. 14-19 illustrate another embodiment of a plug connector 300 constructed in accordance with the principles of the present invention. In FIG. 14, the plug connector 300 includes an insulative housing 301 with a forward mating face 302 from which a projecting mating blade 304 extends and which is shown in this and the other embodiments as a circuit card 305. The circuit card has a forward leading edge 306 which may be angled or chamfered as shown to facilitate its entry into a corresponding slot of an opposing receptacle connector of the type described and shown at reference numerals 8 and 1150 above. The plug connector 300 includes first and second (or top and bottom) flanges 310, 312 that extend forwardly from the plug connector body portion 309 and specifically from the forward face 302.

As shown in FIG. 15, the top and bottom flanges 310, 312, each preferably extend past the leading edge 306 of the circuit card 305, a preselected distance **D** so as to provide protection

to the circuit card leading edge 306 against stubbing and accidental shorting. The top flange 310 is preferably angled along its side edges 316 and these angled edges provide a measure of “lead-in” to the flange 310 and the plug connector 300 when inserted into either a guide member, receptacle connector or both. As shown best in FIG. 18, the top flange 310 preferably has a width that is greater than the width of the circuit card 305, but that the bottom flange 312 has a width that is preferably less than the width of the circuit card 305. This is so the bottom flange 310 may easily fit into the receiving space that is along the bottom surface of the receptacle connectors intended for use with the plug connectors of the present invention. With this distance differential, it is less likely that the bottom flange 310 will collide with the legs of the opposing receptacle connector. The circuit card 305 is disposed between these two flanges 310, 312 and each flange shall provide a measure of protection to the circuit card 305 whether it is oriented horizontally or vertically.

This embodiment 300 also includes a latch mechanism 325 that includes a frame member 326 that is preferably formed as part of the connector body portion 309. This frame member 326 defines a slot 327 which receives a latch member 328. The latch member 328 is best shown in FIGS. 16 & 17 and may be formed from a single piece of metal that is folded upon itself along a forward edge 329 thereof. This folding divides the piece into two portions, the first being a generally planar base, or anchor portion 330, and a contoured actuating portion 331. The base portions has one or more interference projections 332 that are formed along the side edges 333 and which embed themselves or “skive” into the interior sidewalls 340 of the frame member slot 327 in order to primarily retain the latch member 328 in place on the plug connector 300.

One or more upturned latch tabs 346 are formed in the latch member 328 and these tabs 346 engage corresponding openings or recesses formed in the guide member as shown best in FIG. 11. The actuating portion 331 is bent at a slight upward angle so that it may flex within the constraints of the frame member 326. In this regard, the slot 327 includes, as shown best in FIG. 19, interior grooves, or channels 340 that receives the side edges 333 and skiving projections 332 of the latch member 328. The base portion 330 is slightly larger than the actuating portion 331 so that it will create an interference fit within the frame member and so the actuating portion will easily flex up or down in place within the frame member 326. In order to capture the actuating portion 331, the rear end 335 thereof may include one or more tabs 336 that project out to the side and these tabs are captured in their possible vertical movement (up and down) by shoulders 329 that are formed along the interior surfaces 340 of the slot 327. The area beneath

the shoulders 329 is recessed as at 341 to permit the tabs 336 to fit and deflect when the button portion 326 of the actuating portions 331 is pressed down.

5 The forward end 345 of the frame member 326 may be formed as a solid abutment on the top surface of the plug connector body portion and it may also have angled side edges 346. This forward end 345 can thus serve as another keying feature in addition to the body portions notches 1207 and the top and bottom flanges previously described. In order to effect such a keying function, the guide member may include a channel that will guide and accommodate the frame member forward end 345. The top flange 310 may also be provided with a transverse recess 311 that is spaced away from the front edge of the top flange 310. This recess receives
10 the corresponding detent of a guide member press tab as described earlier.

In this embodiment, the circuit card alignment means 350 takes a slightly different form. This alignment means includes the projecting lugs 351 that extend outwardly from the side surfaces of the plug connector body portion 309, but instead of the lugs being single projections, the rear portion of the connector body portion 309a has an increased width so that two stop
15 surfaces 352 are defined on each side of the lug 351. The overall T-shape remains the same, but the lugs/stop are made stronger against shearing forces in that the stop surfaces are cut into the plug connector. In this regard, the area forward of the lugs 351 may be considered as being recessed with respect to the enlarged rear 209a of the connector body portion.

CLAIMS

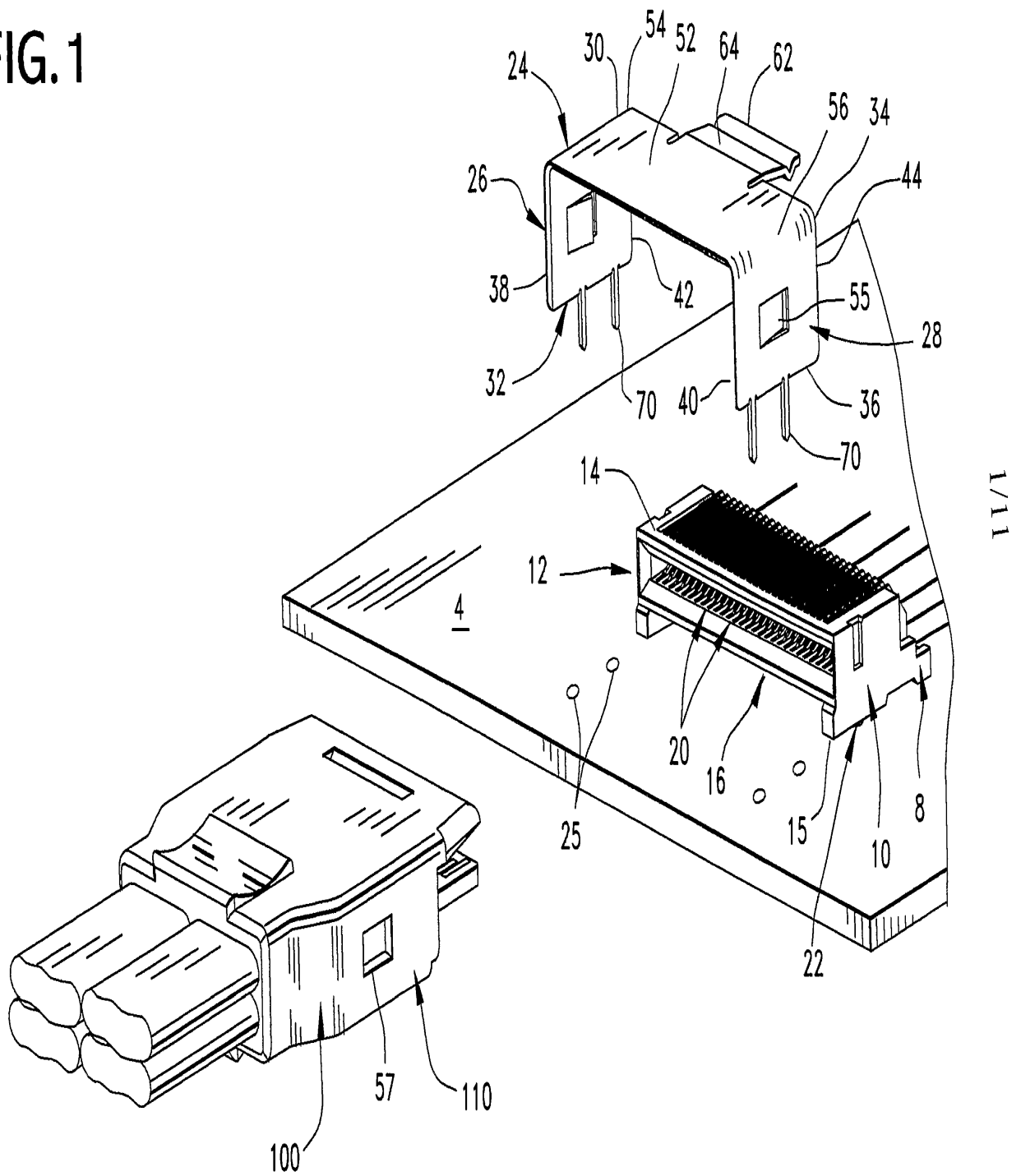
1. A plug connector for connecting wires to a mating connector, comprising: a connector housing, the connector housing including an insulative body portion, the body portion including a forward face;
a mating blade portion, including a leading edge with contacts for mating with the
5 mating connector, the mating blade portion leading edge extending forwardly of the connector body portion forward face for a preselected length;
a plurality of wires terminated to the contacts; and,
said connector housing body portion including a first flange extending forwardly
a first preselected distance from said connector housing body portion and spaced apart
10 from said circuit card, and a second flange extending forwardly a second preselected distance from said connector housing body portion and spaced apart from said mating blade portion and the first flange.
2. The plug connector of claim 1, wherein the connector housing body portion first and second flanges are disposed on opposite sides of said mating blade portion.
3. The plug connector of claim 1, wherein said first flange first preselected distance is greater than said second flange second preselected distance.
4. The plug connector of claim 1, wherein said mating blade portion leading edge and first and second flanges all have respective widths, the width of said mating blade portion leading edge being less than the width of said first flange but greater than the width of said second flange.
5. The plug connector of claim 1, wherein said first flange includes an angled lead-in configuration along side edges thereof.
6. The plug connector of claim 2, wherein said second flange is adapted to be received in a recess disposed underneath a mating connector mounted on a circuit board.
7. The plug connector of claim 1, wherein said mating blade portion includes a circuit card

and connector housing body portion includes a forward mating face, the forward mating faces including a transverse slot through which the circuit card extends.

8. The plug connector of claim 1, wherein said connector housing includes means for registering it with an guide member associated with a mating connector, the registration means including being disposed on said connector housing body portion.
9. The plug connector of claim 8, wherein said registration means includes a projection extending out from said connector housing body portion.
10. The plug connector of claim 9, where said registration means includes at least one T-shaped projection.
11. The plug connector of claim 9, wherein said registration means includes a pair of T-shaped projections disposed on opposite sides of said connector housing.
12. The plug connector of claim 11, wherein T-shaped projections are defined, in part, by recesses disposed along a side of said connector housing.
13. The plug connector of claim 1, further including a latch mechanism supported by said connector housing body, the latch mechanism including a frame member that supports a latch member therein, the latch member including a flexible metal member folded upon itself to define an anchor portion which is received within the frame member, and an actuating portion that is disposed above said anchor portion.
14. The plug connector of claim 7, wherein said circuit card has a leading edge with a respective width and said first flange has a respective width, the width of said circuit card leading edge being less than the width of said first flange.
15. The plug connector of claim 1, wherein one of said first and second flanges includes an engagement recess disposed on a top surface thereof for engaging an engagement portion of a guide member, when said plug connector is inserted into said guide member..

16. The plug connector of claim 1, wherein said connector housing body portion includes two side surfaces, each of the side surfaces extending in a transverse direction to said first and second flanges, each of said two side surfaces including at least one engagement portion for engaging an outer guide member.
17. The plug connector of claim 16, wherein the engagement portion includes a recesses formed in one of said side surfaces.
18. The plug connector of claim 7, wherein said first flange is disposed above said circuit card and said second flange is disposed below said circuit card.

FIG. 1



2/11

FIG.2

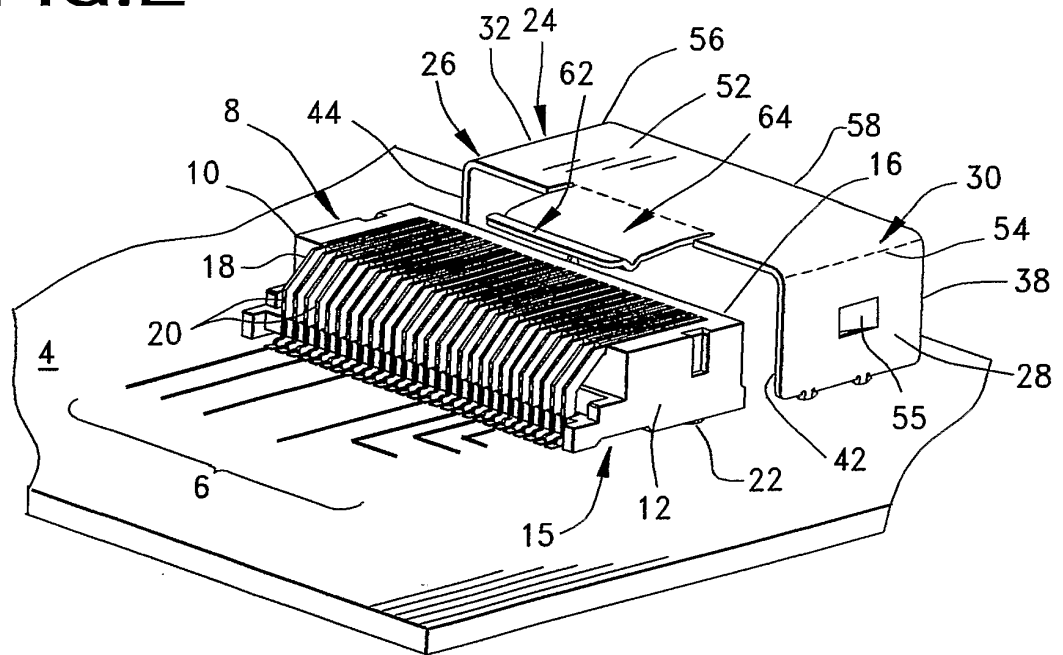
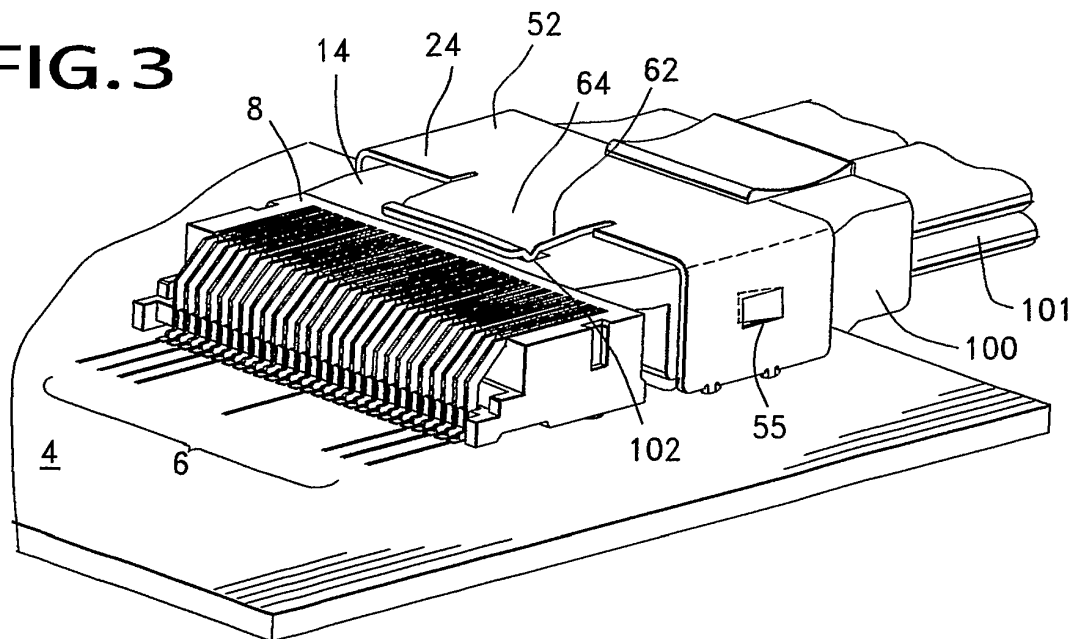


FIG.3



3/11

FIG. 4

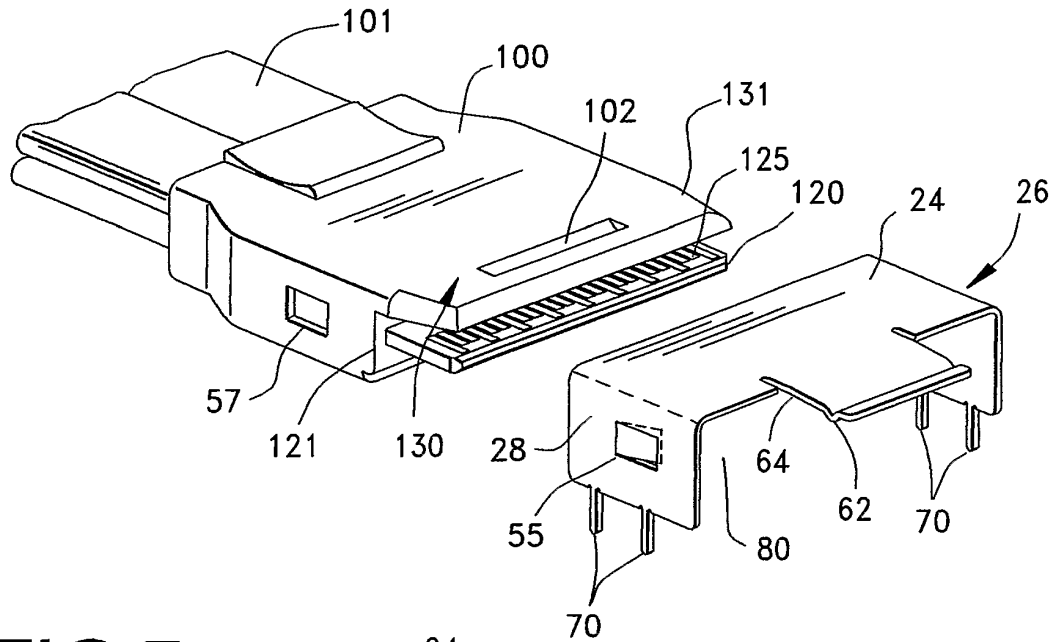


FIG. 5

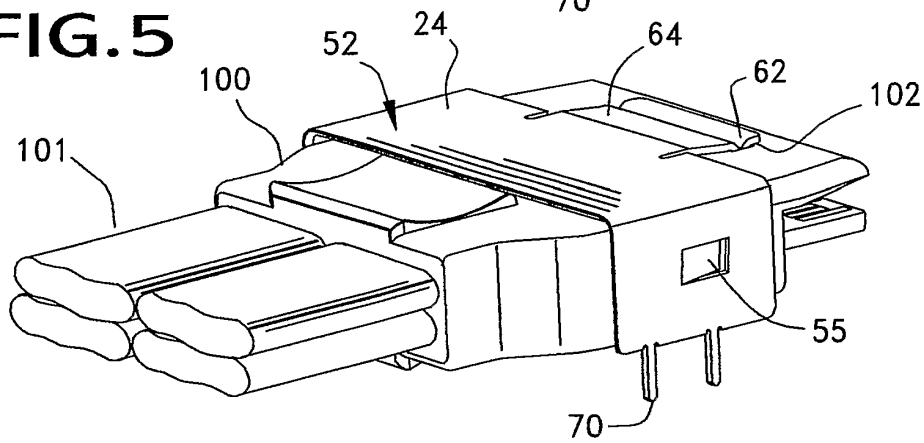
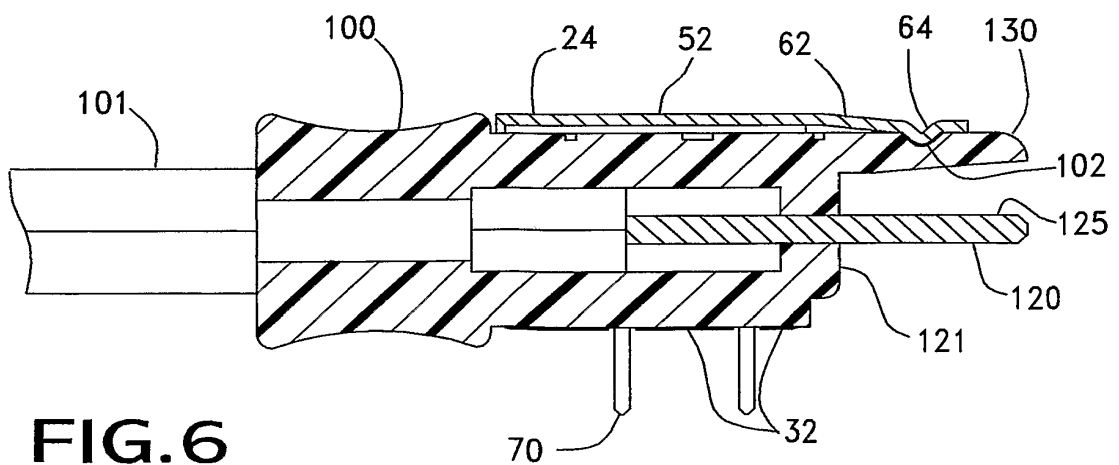


FIG. 6

FIG. 7

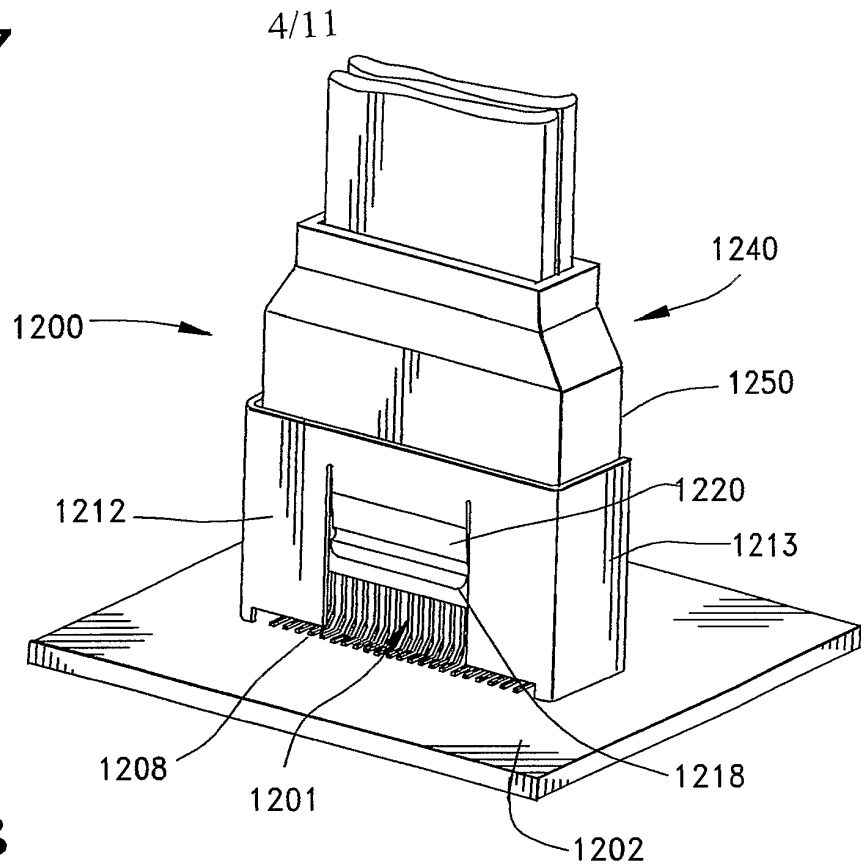
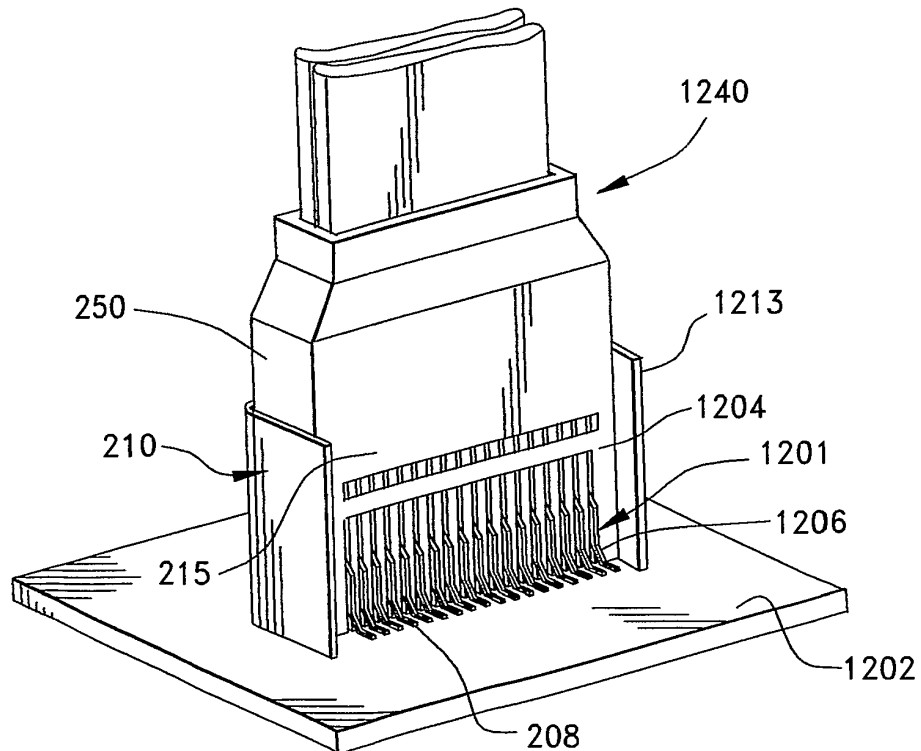


FIG. 8



5/11

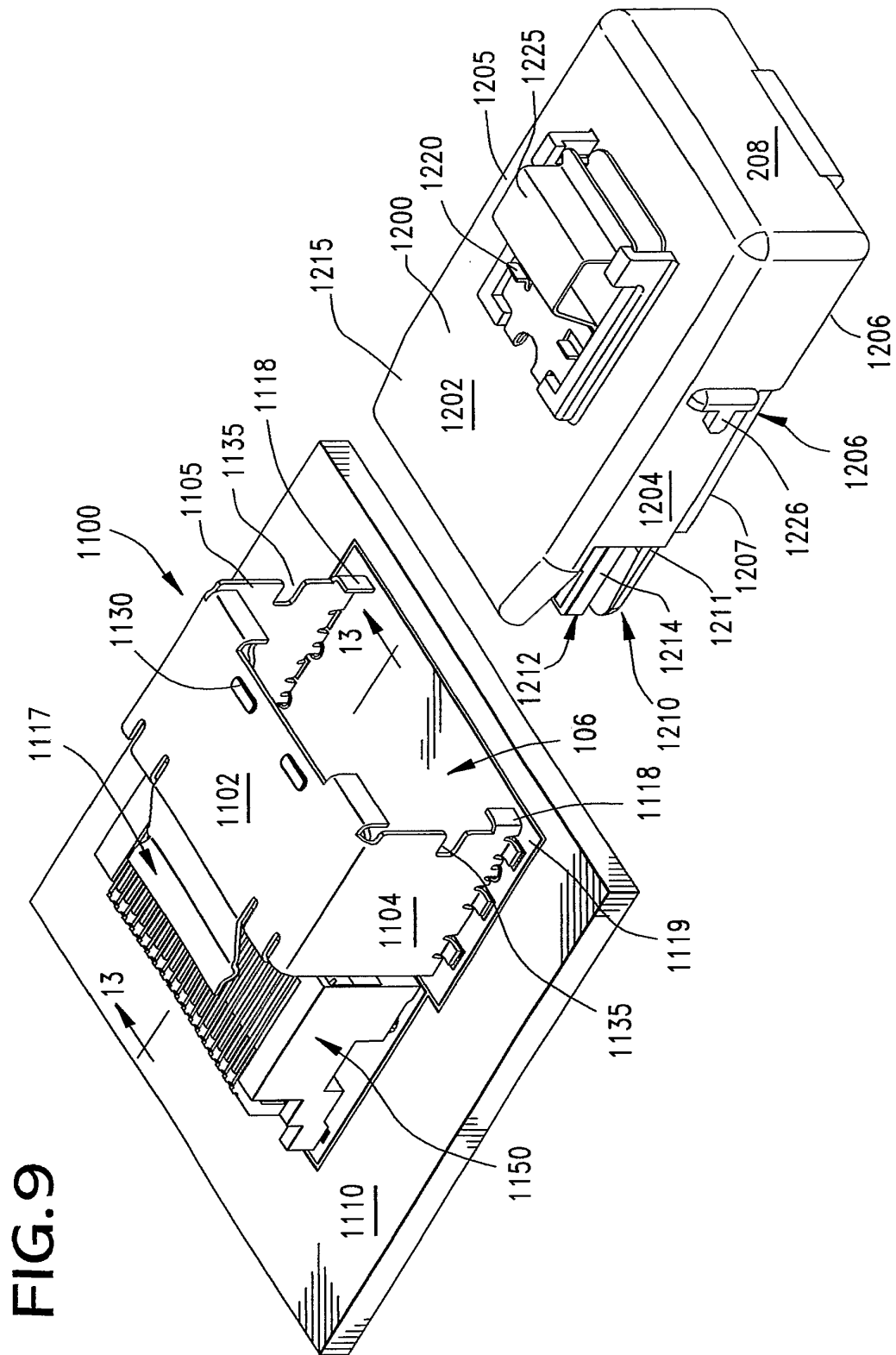


FIG. 9

6/11

FIG. 10

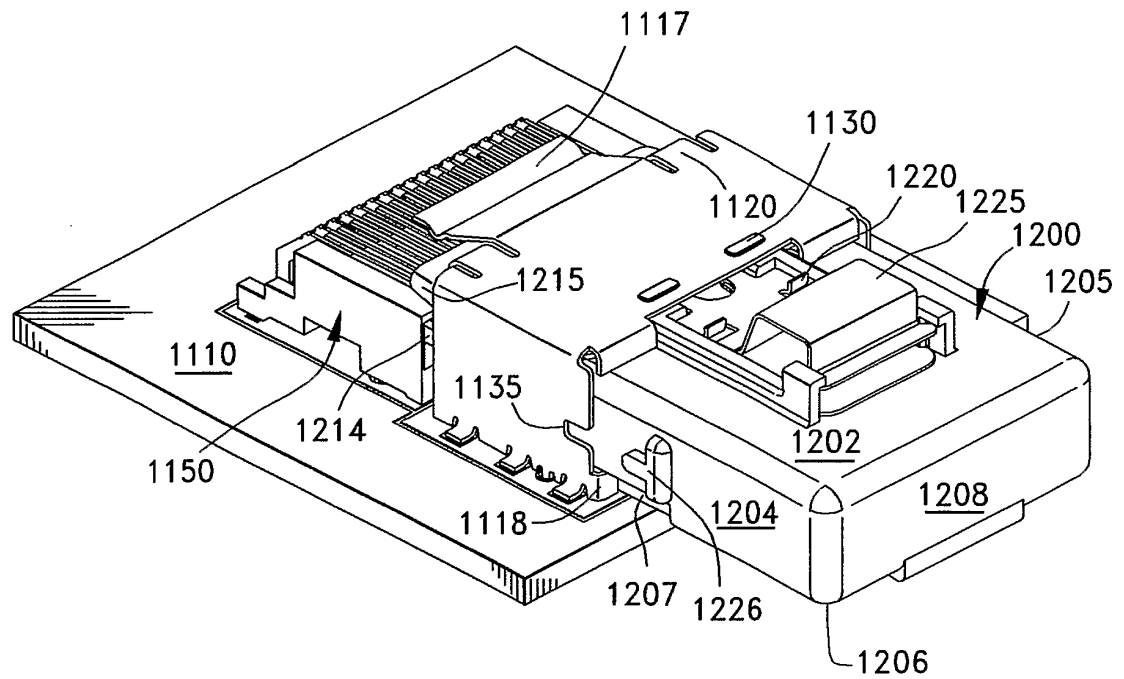
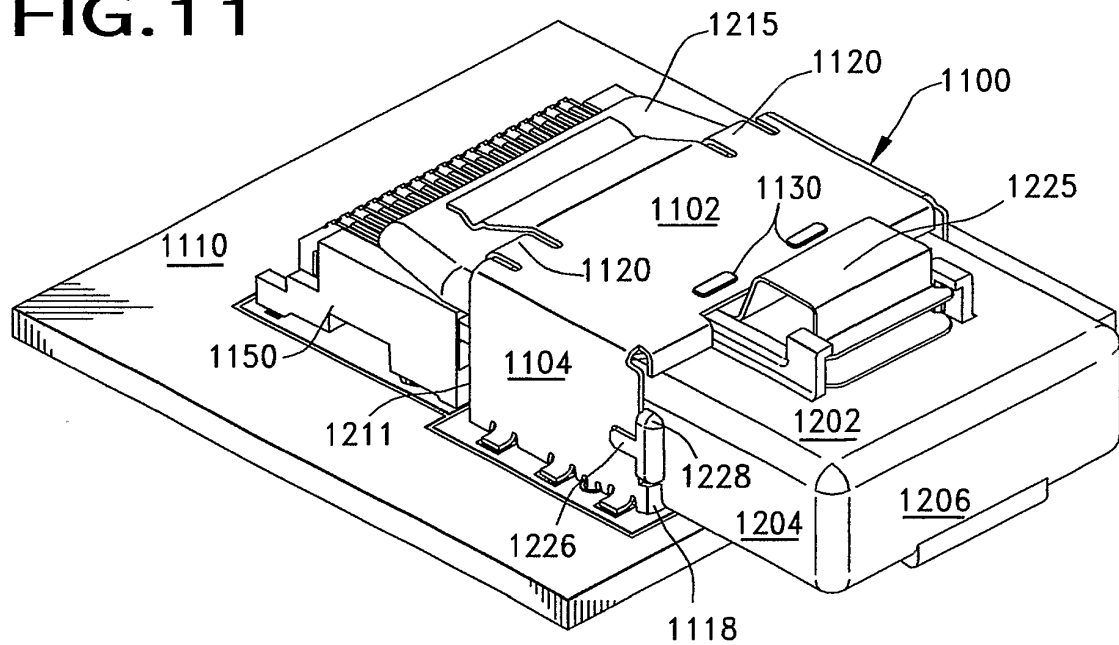


FIG. 1 1



7/11

FIG. 12

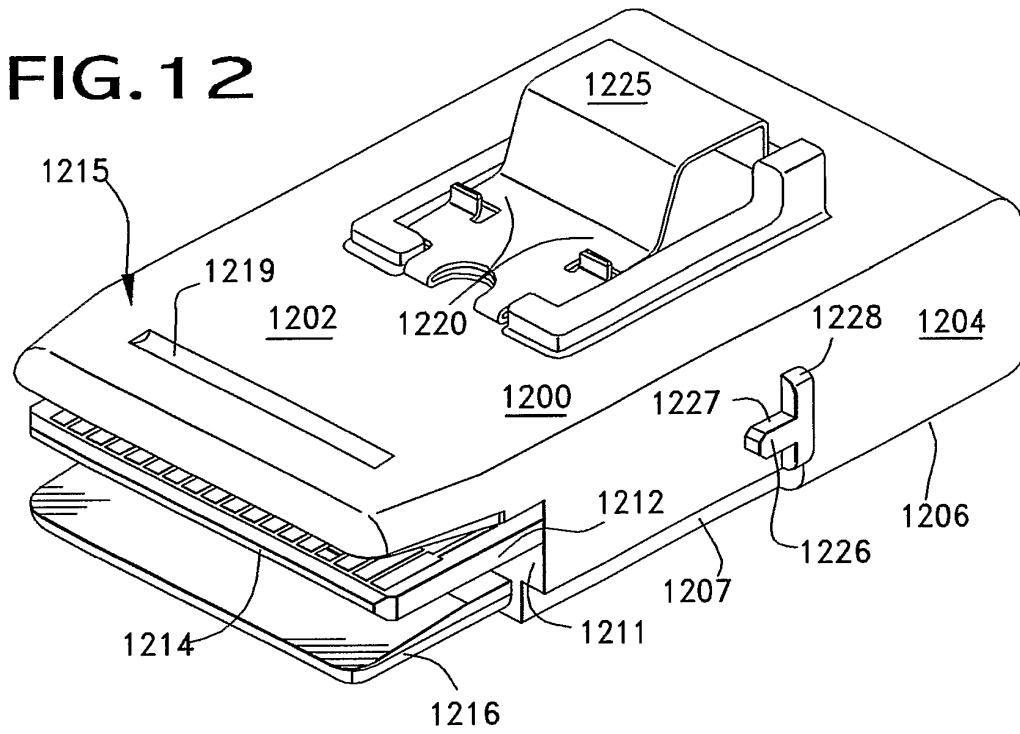
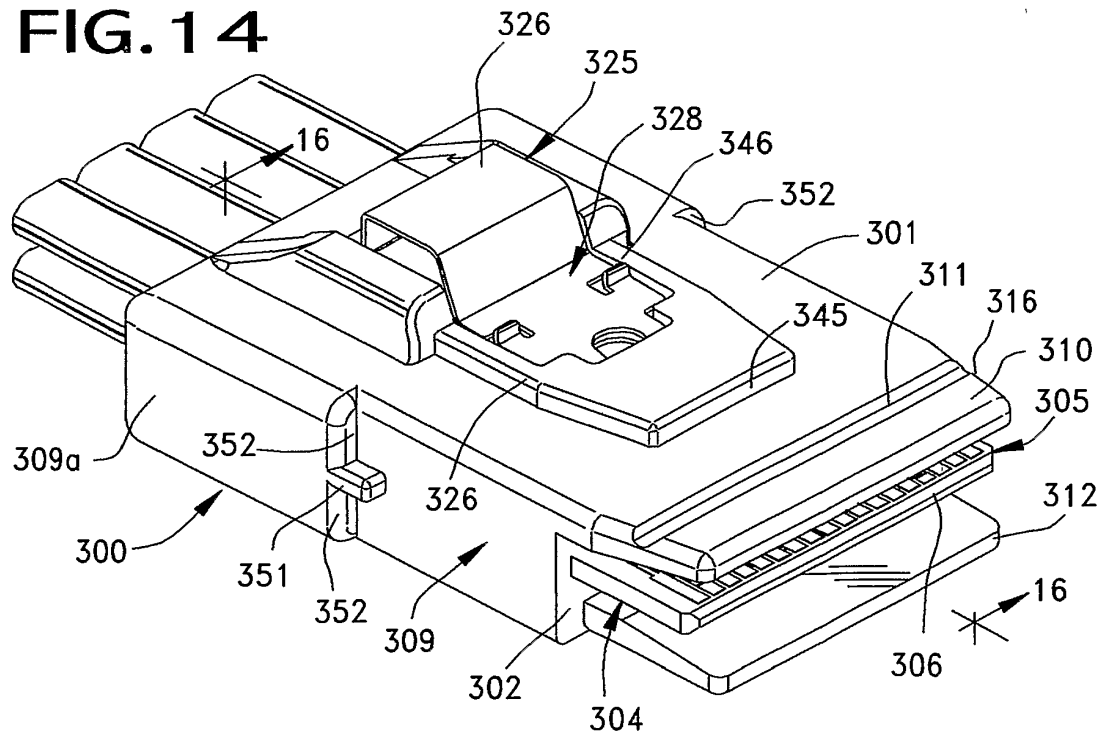


FIG. 14



8/11

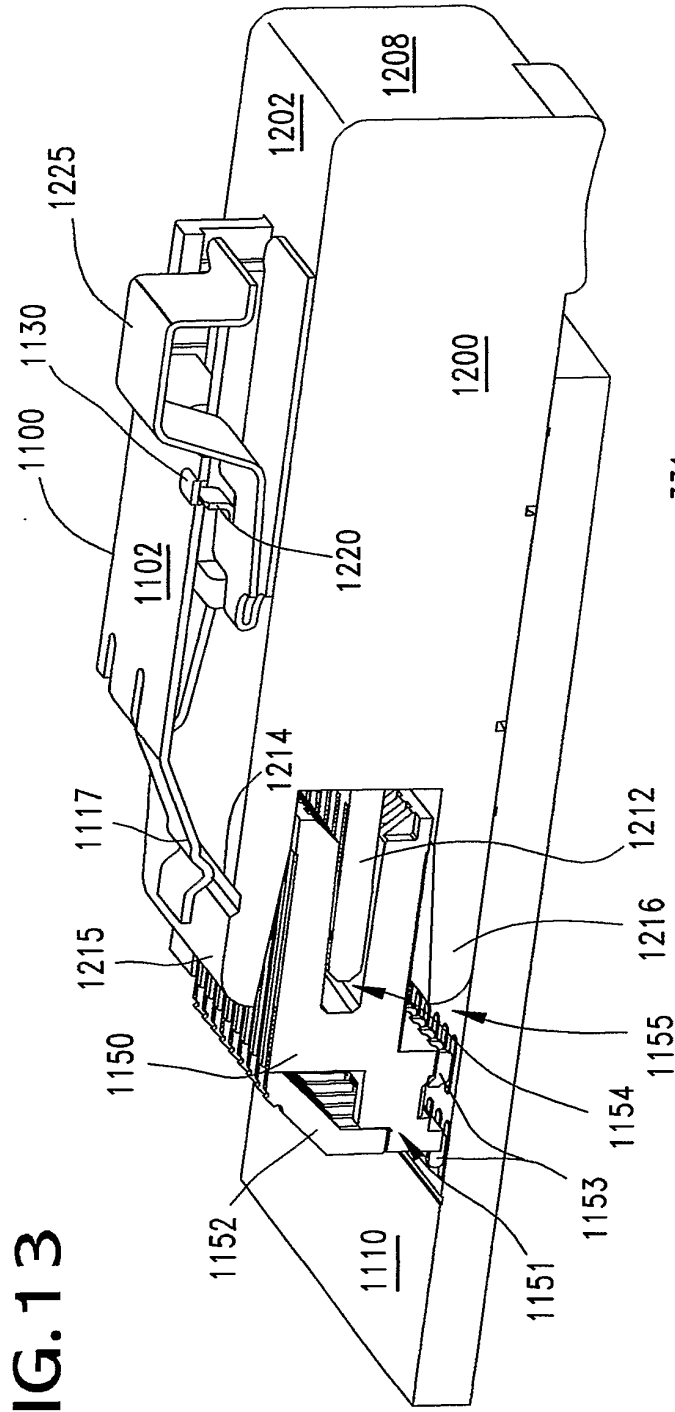


FIG. 13

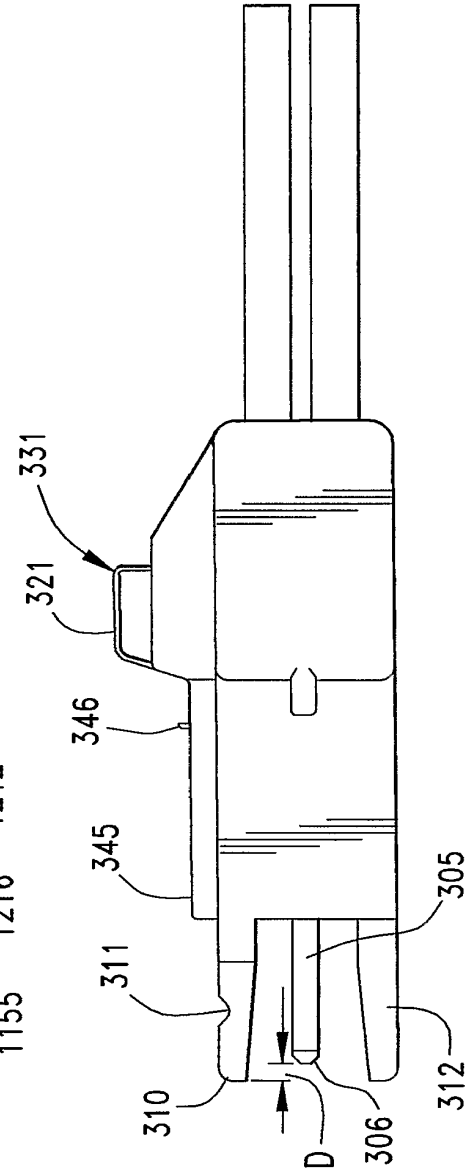


FIG. 15

9/11

FIG. 16

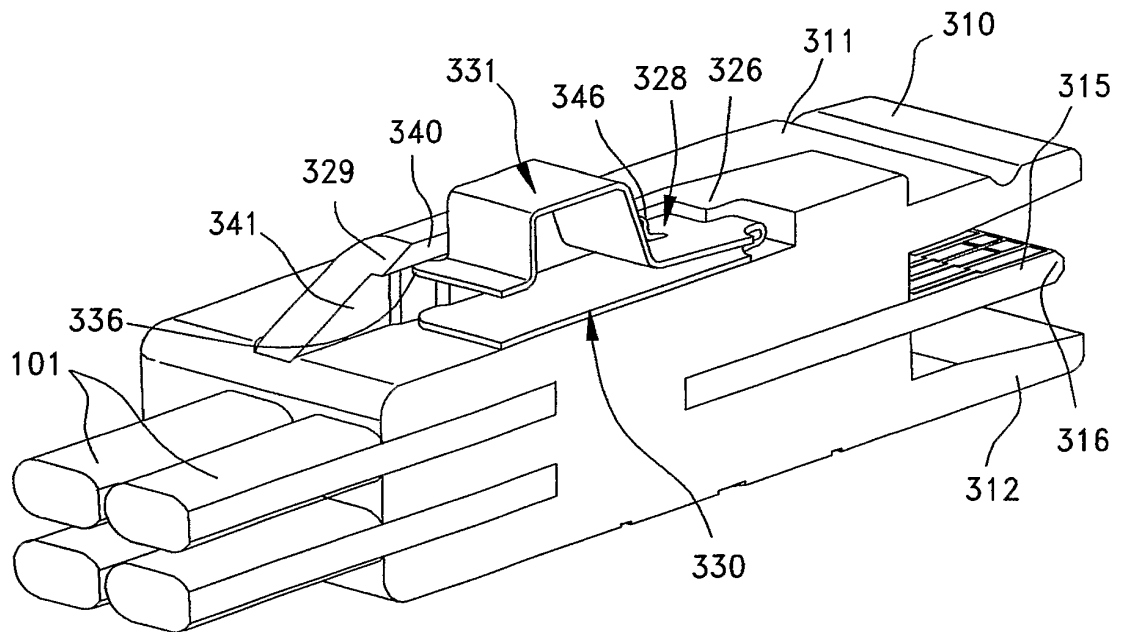
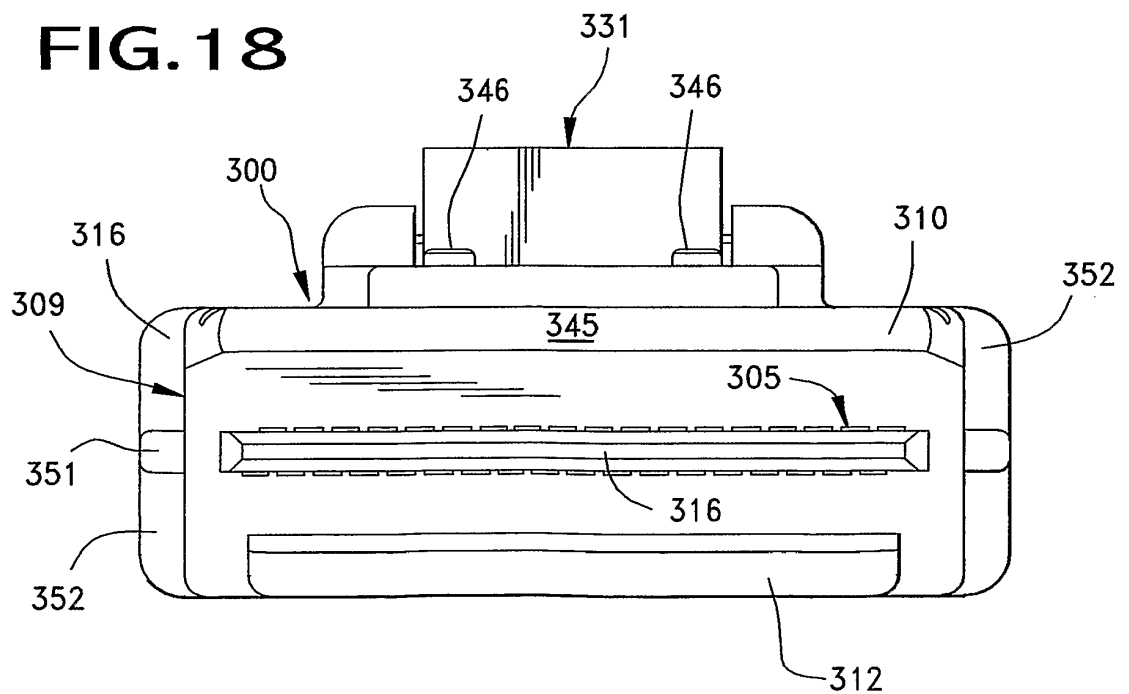


FIG. 18



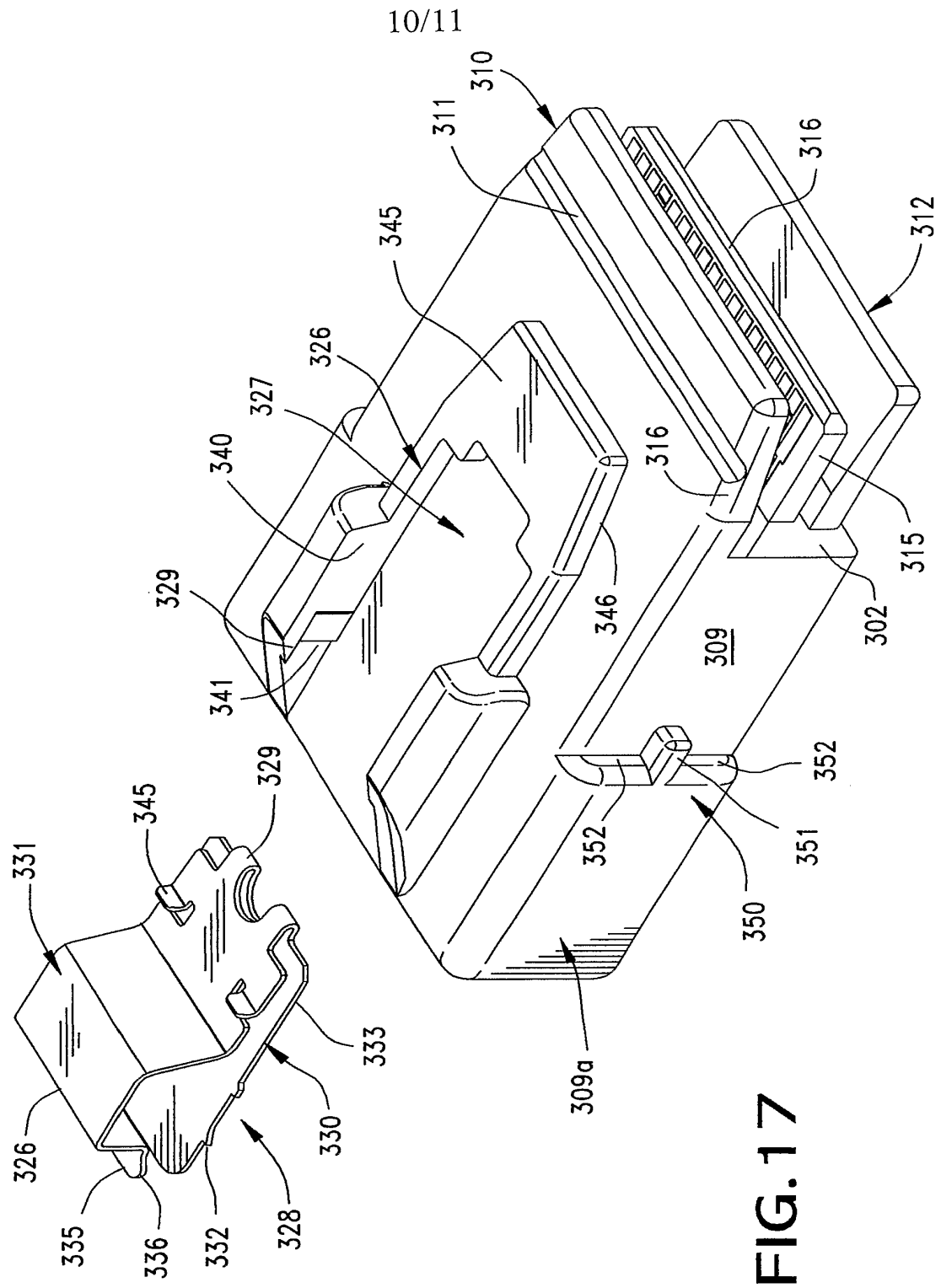


FIG. 19

11/11

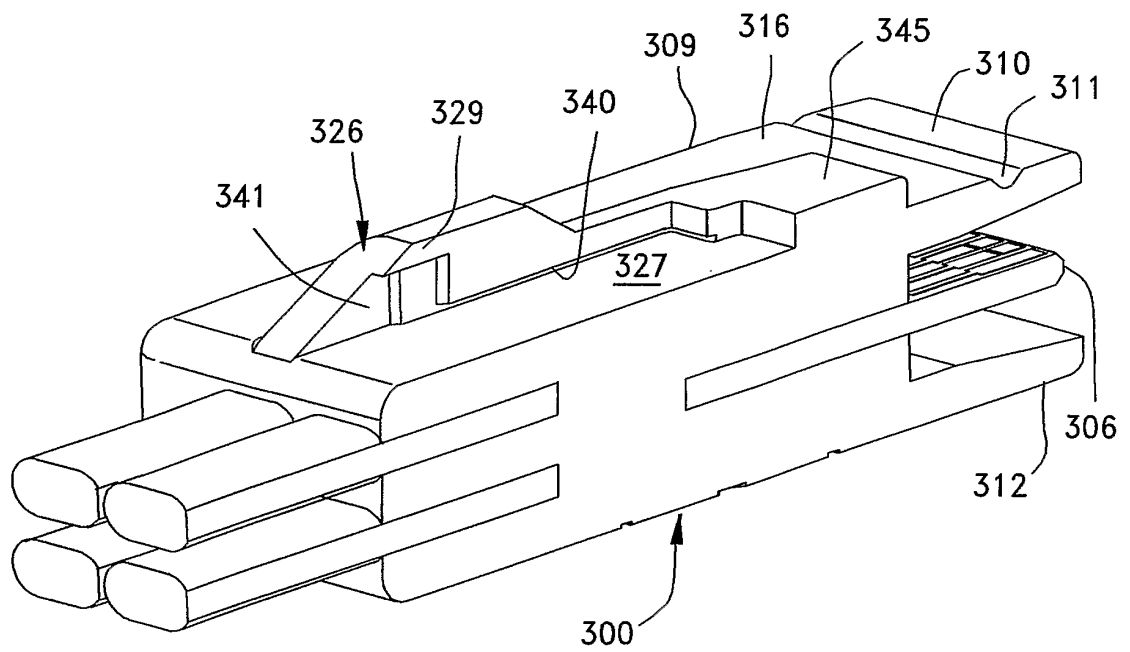
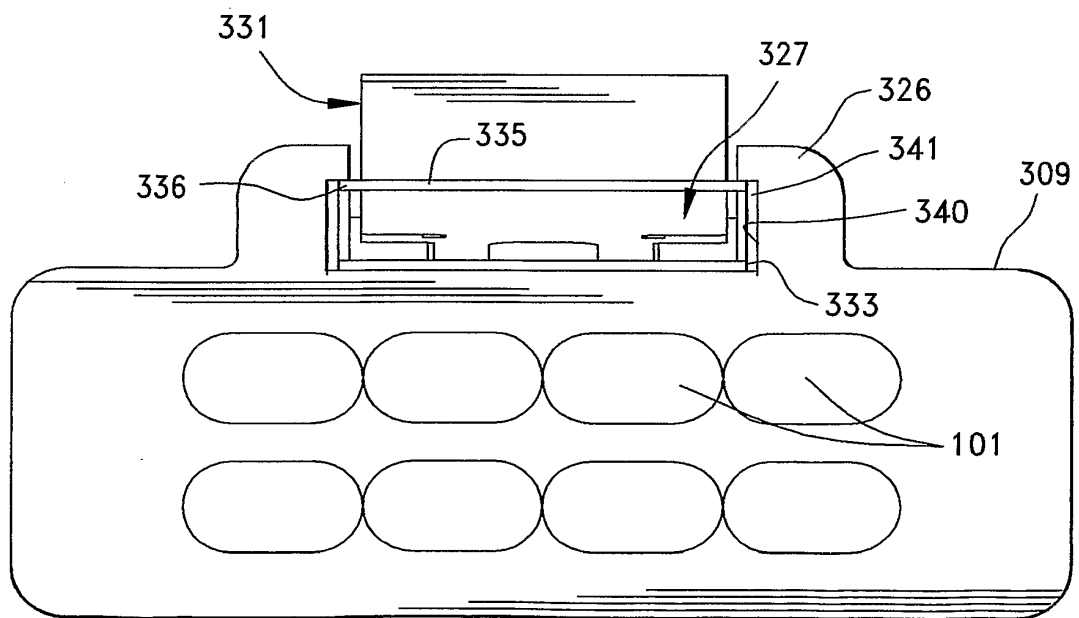


FIG. 20

INTERNATIONAL SEARCH REPORT

International application No

PT/US2005/044757

A. CLASSIFICATION OF SUBJECT MATTER

H01R12/20

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

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 197 54 667 A1 (THE WHITAKER CORP., WILMINGTON, DEL., US) 18 June 1998 (1998-06-18) figure 1	1
A	US 4 878 848 A (INGALSBE ET AL) 7 November 1989 (1989-11-07) figure 2	1
A	US 6 206 711 B1 (SNOW RICHARD HERBERT ET AL) 27 March 2001 (2001-03-27) column 5, line 52 - line 61; figures 1,6	1
A	US 2002/137400 A1 (BILLMAN TIMOTHY B ET AL) 26 September 2002 (2002-09-26) paragraphs [0033], [0040]	1

☐ 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
- *E* earlier document but published on or after the international filing date
- *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.
- *Z* document member of the same patent family

Date of the actual completion of the international search

8 March 2006

Date of mailing of the international search report

20/03/2006

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Langbroek, A

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2005/044757

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 19754667	A1	18-06-1998	GB 2323483 A JP 10177881 A	23-09-1998 30-06-1998
US 4878848	A	07-11-1989	NONE	
US 6206711	B1	27-03-2001	AU 759176 B2 AU 2392199 A BR 9901295 A CA 2269963 A1 EP 0954076 A2 JP 11354183 A NO 991972 A SG 81979 A1 US 6186808 B1 ZA 9902897 A	10-04-2003 04-11-1999 16-05-2000 27-10-1999 03-11-1999 24-12-1999 28-10-1999 24-07-2001 13-02-2001 23-10-2000
US 2002137400	A1	26-09-2002	CN 2490726 Y TW 493806 Y US 2002132477 A1 US 2002127903 A1 US 2002137373 A1 US 6390857 B1	08-05-2002 01-07-2002 19-09-2002 12-09-2002 26-09-2002 21-05-2002

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 July 2006 (13.07.2006)

PCT

(10) International Publication Number
WO 2006/074348 A1

(51) International Patent Classification:
H01R 13/627 (2006.01)

(21) International Application Number:
PCT/US2006/000427

(22) International Filing Date: 6 January 2006 (06.01.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/643,792 7 January 2005 (07.01.2005) US

(71) Applicant (for all designated States except US): **APPLE COMPUTER INC** [US/US]; 1 Infinite Loop, M/s 3-pat, Cupertino, California 95014 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HANKEY, Evans** [US/US]; 124 Anderson Street, -, San Francisco, California 94110 (US). **ZORKENDORFER, Rico** [DE/US]; 327 Lombard Street, -, San Francisco, California 94133

(US). **FILSON, Benjamin** [US/US]; 20 Ryland Park Drive, #316, San Jose, California 95110 (US). **WEBER, Douglas, Joseph** [US/US]; 240 Arbolada Drive, -, Arcadia, California 91006 (US). **ZADESKY, Stephen** [US/US]; 3366 Brittan Avenue, #9, San Carlos, California 94070 (US).

(74) Agent: **NGUYEN, Joseph, A**; PO BOX 700640, San Jose, CA 95170-0640 (US).

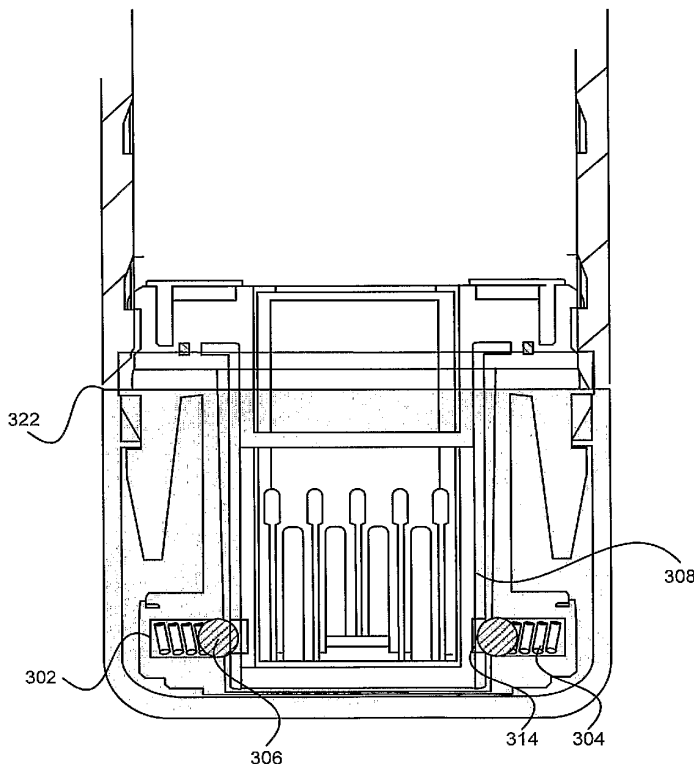
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: UNIVERSAL SERIAL BUS CONNECTOR AND SOCKET COUPLING ARRANGEMENTS

WO 2006/074348 A1



(57) Abstract: A Universal Serial Bus socket-equipped arrangement (USB-SEA) configured for mating with a Universal Serial Bus (USB) plug having a plug metal housing and an aperture disposed in the plug metal housing. The arrangement includes a plug-receiving cavity configured to receive the USB plug. The arrangement further includes a spring-loaded mechanism disposed within the plug-receiving cavity. The spring-loaded mechanism is biased toward an interior region of the plug-receiving cavity. The spring-loaded mechanism is also configured to slide along the connector metal housing of the USB plug when the USB plug is inserted into the plug-receiving cavity and to movably mate with the aperture disposed in the plug metal housing when the USB plug is in a terminal mating position with the USB socket assembly. The spring-loaded mechanism represents one of a spring-loaded ball and a spring-loaded pin.



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT,
RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

— before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

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

UNIVERSAL SERIAL BUS CONNECTOR AND SOCKET COUPLING ARRANGEMENTS

BACKGROUND OF THE INVENTION

[Para 1] Universal Serial Bus (USB) provides an interface standard for communication between a host and external devices. USB has enjoyed success in the marketplace due to the relatively small form factor of its connectors and its relatively high data throughput rates (particularly for USB v.2.0). Further, USB is highly user-friendly, allowing for plug-and-play connections and hot-swapping capability (i.e., allowing the USB device to be plugged into and removed from a host without requiring the host to be rebooted).

[Para 2] As discussed herein, a USB host typically has a USB socket for coupling with an electronic device (i.e., a USB device) having a corresponding USB plug. Hosts may include, but are not limited to desktop units, laptop units, personal digital assistants (PDAs), game consoles, electronic entertainment devices, and hubs. USB devices may include, but are not limited to keyboards, mice, displays, printers, scanners, camera, electronic entertainment devices such as digital audio devices, removable drives, etc.

[Para 3] An external device with USB capability has at least one USB plug. Generally, the USB plug is configured to mate with the host via a host-side USB socket (i.e., receptacle) using friction force. To facilitate discussion, Fig. 1 shows an example of a USB plug and socket. On a USB plug 100, a rectangular metal housing 102 has holes 104 located on the wide side of metal housing 102. Located inside metal housing 102 are plug pins 106, which reside a surface of substrate 108 (i.e., the downward-facing surface due to the orientation of the USB plug in Fig. 1).

[Para 4] On a USB socket 110, receptacle shell 112 has leaf springs 114 located on the wide side of a rectangular receptacle shell 112. At the end of each leaf spring 104 is a tip 116, which is designed to engage with a hole 104 when plug 100 is fully inserted into socket 110. The contact point may also be elsewhere, such as on a bend on the leaf spring. Inside receptacle shell 112 are socket pins 118 residing on a substrate 120. Socket pins 118 are configured to mate with plug pins 106 when USB plug 100 is inserted into USB socket 110.

[Para 5] Friction force allows USB plug 100 to stay mated with USB socket 110. Friction force is created when socket pins 118 make contact with plug pins 106. Friction force is also produced when leaf springs 114 slides along metal housing 102. Yet another source of friction force occurs when tips 116 are lodged inside holes 104.

[Para 6] A USB plug may be protected from environmental damage by capping it with a USB cap. A USB cap may be made of plastic or rubber or a similarly suitable material, typically without a metallic receptacle shell. The USB cap generally relies on friction to keep the cap engaged with the USB plug tip.

[Para 7] It has been found that friction force alone is insufficient in keeping some USB devices connected to their USB hosts or USB caps. If the USB device is not securely connected to the USB host, the USB device may be easily disconnected unintentionally, e.g., when the USB host and USB device combination is accidentally bumped. If the USB device is intended to be a portable device, the USB device may be inadvertently separated from its USB cap or from its USB host when subjected to movement, for example. In either of the above examples, the result is an unintended and undesirable separation and/or possible loss and/or damage to the USB host, the USB device, or both.

SUMMARY OF INVENTION

[Para 8] The invention relates, in an embodiment, to a Universal Serial Bus socket-equipped arrangement (USB-SEA) configured for mating with a Universal Serial Bus (USB) plug having a plug metal housing and an aperture disposed in the plug metal housing. The arrangement includes a plug-receiving cavity configured to receive the USB plug. The arrangement further includes a spring-loaded mechanism disposed within the plug-receiving cavity. The spring-loaded mechanism is biased toward an interior region of the plug-receiving cavity. The spring-loaded mechanism is also configured to slide along the connector metal housing of the USB plug when the USB plug is inserted into the plug-receiving cavity and to movably mate with the aperture disposed in the plug metal housing when the USB plug is in a terminal mating position with the USB socket assembly. The spring-loaded mechanism represents one of a spring-loaded ball and a spring-loaded pin.

[Para 9] In yet another embodiment, the invention relates to a Universal Serial Bus (USB) coupling arrangement. The arrangement includes a portable USB device having a

USB plug. The USB plug has therein a plurality of plug pins. The USB plug also includes a plug metal housing surrounding the plurality of plug pins, at least one surface of the plug metal housing having therein an aperture. The arrangement further includes a USB socket-equipped arrangement (USB-SEA) having therein a plug-receiving cavity. The plug-receiving cavity includes a spring-loaded mechanism configured to bias against the plug metal housing. The spring-loaded mechanism represents one of a spring-loaded ball and a spring-loaded pin. Further, the spring-loaded mechanism is configured to slide along the plug metal housing when the USB plug is inserted into the plug-receiving cavity and to movably mate with the aperture disposed in the plug metal housing when the USB plug is in a terminal mating position with the plug-receiving cavity.

[Para 10] In yet another embodiment, the invention relates to a Universal Serial Bus (USB) coupling arrangement. The arrangement includes a USB plug having therein a plurality of plug pins. The USB plug includes a plug metal housing surrounding the plurality of plug pins. The plug metal housing includes a pair of first parallel surfaces and a pair of second parallel surfaces disposed perpendicular to the first parallel surfaces. The surface of the pair of second parallel surfaces is smaller than a surface of the pair of first parallel surfaces. At least one surface of the pair of second parallel surfaces has therein an aperture. The arrangement further includes a USB socket-equipped arrangement (USB-SEA) having therein a plug-receiving cavity. The plug-receiving cavity includes at least a first generally curved protrusion that is spring-loaded to bias against the plug metal housing. The first generally curved protrusion is configured to slide along the plug metal housing when the USB plug is inserted into the plug-receiving cavity and to movably mate with the aperture disposed in the plug metal housing when the USB plug is in a terminal mating position with the plug-receiving cavity.

[Para 11] In yet another embodiment, the invention relates to a portable electronic system. There is included a portable electronic device having a first plug, the first plug having therein a plurality of plug pins. The first plug includes plug housing surrounding the plurality of plug pins, at least one surface of the plug housing having therein an aperture. There is further included a first socket-equipped arrangement (SEA) having therein a plug-receiving cavity. The plug-receiving cavity includes a spring-loaded mechanism configured to bias against the plug housing. The spring-loaded mechanism is one of a spring-loaded ball and a spring-loaded pin. The spring-loaded mechanism is configured to slide along the plug

housing when the first plug is inserted into the plug-receiving cavity and to movably mate with the aperture disposed in the plug housing when the first plug is in a terminal mating position with the plug-receiving cavity.

[Para 12] These and other features of the present invention will be described in more detail below in the detailed description of various embodiments the invention and in conjunction with the following figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[Para 13] The present invention is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements and in which:

[Para 14] Fig. 1 shows an example of a prior art Universal Serial Bus (USB) plug and socket

[Para 15] Fig. 2 shows, in accordance with an embodiment of the present invention, a USB cap, representing one type of USB socket equipped arrangement (USB-SEA), along with a modified USB plug configured to movably mate with a coupling mechanism in the cap.

[Para 16] Fig. 3 shows, in accordance with an embodiment of the invention, how the steel balls of the detent assemblies of the USB-SEA engage apertures in the USB plug housing.

[Para 17] Fig. 4 shows, in accordance with an embodiment of the invention, example dimensions of the USB plug, including the ball-receiving aperture.

[Para 18] Fig. 5 shows, in accordance with an embodiment of the invention, a view of the plug-receiving cavity of a cap 500, representing an example a USB-SEA.

[Para 19] Fig. 6 shows, in accordance with an embodiment of the invention, an inventive electronic system that includes a host having a socket and a device having a plug, the host having a socket being coupled with the device having a plug using the generally curved detent mechanism and the plug aperture disclosed herein.

DETAILED DESCRIPTION OF VARIOUS EMBODIMENTS

[Para 20] The present invention will now be described in detail with reference to various embodiments thereof as illustrated in the accompanying drawings. In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent, however, to one skilled in the art, that the present invention may be practiced without some or all of these specific details. In other instances, well known process steps and/or structures have not been described in detail in order to not unnecessarily obscure the present invention.

[Para 21] Various embodiments are described hereinbelow, including methods and techniques. It should be kept in mind that the invention might also cover articles of manufacture that includes a computer readable medium on which computer-readable instructions for carrying out embodiments of the inventive technique are stored. The computer readable medium may include, for example, semiconductor, magnetic, opto-magnetic, optical, or other forms of computer readable medium for storing computer readable code. Further, the invention may also cover apparatuses for practicing embodiments of the invention. Such apparatus may include circuits, dedicated and/or programmable, to carry out tasks pertaining to embodiments of the invention. Examples of such apparatus include a general purpose computer and/or a dedicated computing device when appropriately programmed and may include a combination of a computer/computing device and dedicated/programmable circuits adapted for the various tasks pertaining to embodiments of the invention.

[Para 22] In accordance with embodiments of the present invention, there are provided more secure coupling arrangements between a Universal Serial Bus (USB) plug and a USB socket-equipped arrangement (USB-SEA). The USB plug is provided with at least one aperture, which is configured to mate with a generally curved protrusion located in the plug-receiving cavity of the USB-SEA.

[Para 23] As the term is employed herein, a USB socket-equipped arrangement (USB-SEA) may include any USB host that can save, recall, transfer, and/or process data. Beside electronic systems traditionally thought of as a USB host, a USB device may be plugged into other USB socket-equipped arrangements (USB-SEAs). For example, a battery pack, while not typically thought of as a USB host, may nevertheless have a USB socket to allow a USB

device to obtain battery energy therefrom. As another example, a USB battery charger, while not typically thought of as a USB host, may nevertheless have a USB socket to supply electrical charge to a rechargeable battery within the USB device.

[Para 24] As another example, a display (such as a portable or stationary display employing liquid crystal display technology or other display technologies) may have a USB socket to enable the display to display data received from the USB device. As another example, a storage device (such as a portable or stationary storage device employing hard disks or other storage technologies) may have a USB socket to enable the storage device to store data received from the USB device or to enable the storage device to furnish data to the USB device. As another example, a remote control arrangement may include a first portion having a USB socket for mating with the USB plug of the USB device. The remote itself may communicate with this first portion using a signal-carrying wire or via a wireless approach. In these cases, power and/or signals (e.g., control, audio, video, data, etc.) are communicated between the USB-SEA and the USB device via one or more of the socket pins and one or more of the plug pins.

[Para 25] As another example, a cap having a USB-like socket may be employed to protect the plug and the plug pins from environmental damage. Thus, a USB-SEA may include all the above examples and other arrangements having a plug-receiving cavity configured to mechanically and/or electronically mate with a USB plug.

[Para 26] A USB-SEA may be either stationary or portable (e.g., capable of being carried or worn by the human user). Given the rising popularity of portable USB entertainment and/or communication devices (such as the popular IPOD™ devices, available from Apple Computer, Inc. of Cupertino, CA), a USB-SEA, such as a USB cap, oftentimes includes a lanyard to allow the user to wear the USB device when the USB device is plugged into the USB-SEA.

[Para 27] The plug-receiving cavity of the USB-SEA may represent a USB socket having a rectangular metallic housing and a socket pin-bearing substrate. The plug-receiving cavity of the USB-SEA may also represent, for example, the recess in a USB cap into which the USB plug may be inserted. In the case of the USB cap, there may be no metallic housing and/or socket pins as called for by the industry-standard USB electrical and mechanical specification.

[Para 28] The generally curved protrusion is designed to easily accommodate the initial insertion of the USB plug tip and to slide along the metal housing of the USB plug prior to positively engaging with the aperture. Further, the generally curved protrusion is biased against the metal housing of the USB socket by a biasing means, such as a coil spring. Since different coil springs can be manufactured with different biasing forces, it is possible for a USB socket to accommodate different USB devices simply by replacing one coil spring with another coil spring to achieve a higher or lower engaging/disengaging force.

[Para 29] When the generally curved protrusion couples with the aperture, a positive tactile feedback is provided. The positive tactile feedback provides the user with a secure feeling that the USB plug and USB-SEA is fully engaged and the generally curved protrusion of the USB-SEA has positively engaged with the aperture in the metal housing of the USB plug.

[Para 30] In an embodiment of the invention, the distance between the USB plug aperture that accepts the generally curved protrusion of the USB-SEA and the start of the plug overmold portion (i.e., the rubber or plastic molding that can be grasped by the user) is matched with the distance between the generally curved protrusion of the USB-SEA and opening of the plug-receiving cavity of the USB-SEA so that when the USB plug is fully inserted into the USB-SEA and the aperture in the USB plug engages the generally curved protrusion in the USB-SEA, there is visually substantially no gap between the start of the plug overmold portion of the USB plug and the opening of the plug-receiving cavity of the USB-SEA. The closing of this gap provides a visual confirmation that the USB plug is securely mated with the USB-SEA.

[Para 31] In an embodiment, no external collar arrangement is required on or near the socket to retract the generally curved protrusion in order to facilitate insertion and full engagement of the USB plug and the USB-SEA. This feature enhances user-friendliness since there may be no space on or around the USB-SEA to accommodate an external collar. Even if there is space, such a collar may be too small and uncomfortable for users with large fingers. In an embodiment, the retraction of the generally curved protrusion (e.g., steel ball) is automatic upon insertion of the USB plug into the USB-SEA and such automatic retraction is sufficient to allow the full engagement of the USB plug and the USB-SEA when the USB plug is in its terminal coupling position. Further, the retraction of the generally curved protrusion (e.g., steel ball) from the aperture on the plug is automatic upon pulling the USB

plug apart from the socket on the USB-SEA. In other words, no collar manipulation is required, other than pulling the plug apart from the socket, to separate the USB plug from the socket. Once the generally curved protrusion is dislodged from the plug aperture, the generally curved protrusion may slide along the plug housing until the USB plug and the socket are apart.

[Para 32] The features and advantages of embodiments of the invention may be better understood with reference to the figures and discussions that follow. Fig. 2 shows, in accordance with an embodiment of the present invention, a USB plug and a USB cap, with the USB cap representing one type of USB-SEA. On USB plug 200, a metal housing 202 comprises of two pairs of parallel surfaces. A first pair of parallel surfaces 204 is perpendicular to a second pair of parallel surfaces 206. Located on at least one side of the second pair of parallel surfaces 206 is an aperture (i.e., retention hole) 208. Preferably, there are two apertures 208, one on each of the two parallel surfaces 206. Located inside metal housing 202 are plug pins 210, which reside on top of a substrate 212.

[Para 33] On a USB cap 220, inner cap 222 has a cavity 226. A ball detent assembly 224 houses a coil spring and a steel ball, with the coil spring biasing the steel ball in the direction into the plug-receiving cavity of the USB-SEA. Ball detent assembly 224 is essentially a tube with one closed end and a constricted open end that is designed to snugly capture the steel ball in a position such that at least a portion of the steel ball protrudes from the open end of the ball detent assembly. This arrangement is shown in greater detail in Fig. 3 herein.

[Para 34] The coil spring is disposed inside the tube. Since the constricted end is dimensioned to snugly capture the steel ball, the steel ball may be press-fitted into position during manufacturing. Ball detent assembly 224 may be ultrasonically welded into cavity 226 in inner cap 222. There are other ways that ball detent assembly 224 may be coupled with cavity 226. These methods may include, but are not limited to, glued in, pressed in, heat-processed, heat-sunked, etc. In a preferred embodiment, there are two ball detent assemblies 224, one on each side of inner cap 222. Fig. 3 shows, in an embodiment of the invention, how the steel balls of the detent assemblies engage apertures in the USB plug housing. In Fig. 3, a steel ball 300 is disposed inside a detent assembly 302. Detent assembly 302 includes a coil spring 304 that pushes against a ball 306. In the embodiment of Fig. 3, steel ball 300 represents a generally curved protrusion for engaging with a

corresponding aperture in the USB plug housing, and coil spring 304 represents a biasing mechanism for biasing the generally curved protrusion against the USB plug housing when the USB plug is inserted into the plug-receiving cavity in the USB-SEA.

[Para 35] Generally, spring-loaded ball 300 is configured to bias toward the interior region of the plug receiving cavity and against a plug metal housing 308 when the USB plug is inserted into the plug-receiving cavity of the USB-SEA. Thus, when the USB plug is inserted into the USB-SEA, plug metal housing 308 causes ball 306 to travel outward (e.g., retracts) and compress against coil springs 304. The amount of pressure that ball 306 exerts against coil spring 304 lessens when ball 300 mates with aperture 310 in metal housing 308 of the USB plug. The transition by ball 306 from a sliding motion along the metal housing surface of the plug to a snapping motion as ball 306 engages with the aperture in the plug metal housing creates a human-perceptible tactile sensation or human-perceptible sound. This human-perceptible tactile sensation or sound advantageously confirms, in a positive manner, to the user that a definitive engagement between the USB plug and the USB-SEA has been achieved.

[Para 36] Most advantageously, once ball 300 snaps into aperture 310 of the USB plug housing, a significant amount of force is required to disengage the USB plug from the USB-SEA since the disengaging force must compress the spring sufficiently to allow ball 300 to “slide out” of its rested position inside aperture 310. It should be appreciated that the amount of disengagement force is configurable by simply selecting the appropriate biasing device (e.g., the coil spring) that provides the desired biasing force.

[Para 37] Fig. 3 also shows that once the USB plug is in the terminal mating position with the plug-receiving cavity of the USB-SEA, there is substantially no gap between the overmold portion of the USB plug and the opening of the plug-receiving cavity of the USB-SEA. The closure of the gap (shown in Fig. 3 by reference number 322) is achieved by designing the USB plug tip, the USB plug overmold, the aperture in the USB plug metal housing, the depth of the plug-receiving cavity of the USB-SEA, and location of the biasing ball with the appropriate dimensions. This closure advantageously provides a positive visual feedback to the user that positive engagement has taken place.

[Para 38] In an embodiment of the invention, ball 300 may be located on each side of plug-receiving cavity of the USB-SEA. Further, aperture 310 may be located on each side of plug metal housing 308. Thus, when the USB plug is inserted into the plug-receiving cavity

of the USB-SEA, the ball on each of the plug-receiving cavity of the USB-SEA mates with the aperture located on each side of the plug metal housing.

[Para 39] Note that the balls in the plug-receiving cavity of the USB-SEA and their corresponding apertures in the USB plug housing are alternatives to, or preferably additions to, the prior art leaf springs/tips and corresponding holes (e.g., leaf springs 104/tips 106 and corresponding holes 104 of Fig. 1). Accordingly, the combination of ball 300/aperture 310 increases the force requires to disengage the USB from its USB-SEA. In the case where the USB-SEA does not have a metal housing (such as in a USB cap, for example), the biasing ball/corresponding aperture combination not only replaces the prior art leaf spring/tip and corresponding hole but further allows the plug-receiving cavity of USB-SEA to be formed of any material, even resilient materials such as soft plastic or hard rubber since the function of positively engaging the apertures in the plug metal housing is provided by the biasing ball and not by leaf spring/tip molded from the same material that forms the plug-receiving cavity of the USB-SEA. Still further, the use of a removable (i.e., not integrally molded) biasing arrangement, such as coil spring 304 allows the manufacturer to employ different coil springs to achieve different biasing force.

[Para 40] Accordingly, it is possible to tailor the tactile/audible feedback to the customer's specification, as well as to tailor the amount of force required to engage/disengage the USB plug from the USB-SEA simply by employing different springs having different amounts of biasing force. This customization ability would not have been possible had the biasing mechanism been integral (i.e., hence non-customizable) with the plug-receiving cavity of the USB-SEA, such as the case when the prior art leaf spring/tip is formed integral with the metal housing of the USB socket. This customization ability also would not have been possible had the biasing mechanism been non-replaceable, such as the case with any aperture-engaging nub or spring that is integrally formed with the plug-receiving cavity of the USB-SEA. Using embodiments of the present invention, the manufacturer of the USB-SEA now has the ability to configure the same USB-SEA to handle different USB devices by simply selecting different springs during the manufacturing process.

[Para 41] The next two figures provide the dimensions for the new USB plug and USB socket. Fig. 4 shows, in an embodiment of the invention, example dimensions of the USB plug, including the ball-receiving aperture. Distance 402, which is the distance from start of the overmold portion of the USB plug to the center of the aperture, is about 9.96 millimeter

with a tolerance of about 0.05 millimeter. Distance 404, which is the diameter of the aperture, is about 1.60 millimeter with a tolerance of about 0.10 millimeter. Distance 406, which is the thickness of the USB plug (i.e., the distance between the two wider parallel surfaces of the plug metal housing), is about 4.50 millimeter with a tolerance of about 0.05 millimeter. Distance 408, which is the distance from the center of the aperture to one of the wider parallel surfaces of the USB plug metal housing, is about 2.25 millimeter with a tolerance of about 0.05 millimeter.

[Para 42] Fig. 5 shows, in an embodiment of the invention, a view of the plug-receiving cavity of a cap 500, representing an example USB-SEA. The view of Fig. 5 is directly into the plug-receiving cavity, from the direction of USB plug insertion. Plug-receiving cavity 502 may be formed of any suitable material and is dimensioned to snugly fit the USB plug metal housing. Ball 504 is about 2 millimeter in diameter with a 0.5 millimeter protrusion inside the plug-receiving cavity. The ball 504 may be made of highly polished stainless steel and/or may have a different dimension depending on applications.

[Para 43] There are many ways to apply the coupling arrangements disclosed in embodiments of the invention. For an example, in an embodiment of the invention, the USB plug may be part of an electronic entertainment device, which is configured to play electronically stored music (i.e., MP3 player). The USB plug may mate with a USB cap that may be coupled to a lanyard. This coupling arrangement allows the user to wear the USB electronic entertainment device around his neck, via the lanyard cap, without fear of unexpected disengagement.

[Para 44] In an embodiment of the invention, the electronic entertainment device may mate with a plug-receiving cavity that is coupled to a human attachment arrangement. The human attachment arrangement (i.e., armband) is configured to be worn by the user. Thus, the user may insert the electronic entertainment device into the armband and proceed to enjoy the electronic entertainment device without fearing that the electronic entertainment device might inadvertently become disengaged from the armband through normal activities. For example, a runner can enjoy listening to his favorite songs playing on an MP3 player, which is attached to an armband, without worrying that the MP3 player may accidentally become disengaged.

[Para 45] In an embodiment of the invention, the USB plug may be part of an electronic image-capturing device (i.e., pen scanner). Similar to the electronic entertainment device, the

electronic image-capturing device may be connected to a USB socket, which may be part of a lanyard cap or a human attachment arrangement (i.e., armband). In either case, the user may insert the electronic image-capturing device into the USB socket without fearing that the electronic image-capturing device may unintentionally disengage from the USB socket.

[Para 46] Fig. 6 shows, in accordance with an embodiment of the invention, an inventive electronic system that includes a host having a socket and a device having a plug, the host having a socket being coupled with the device having a plug using the generally curved detent mechanism and the plug aperture disclosed herein. The host having a socket may represent any electronic or electrical sub-system (e.g., a display, an external hard disk, an external storage device, a battery pack, a charger, etc.) The device having a plug may represent any electronic or electrical sub-system (e.g., a portable audio player, a portable video player, a portable memory device, etc.) that is configured to be coupled to the host via the plug and the socket. As mentioned, the plug and the socket are endowed with apertures and detent mechanisms in the manner discussed herein. Note that although the preferred or disclosed embodiment refers to the USB plug and the USB socket, it is possible that the plug and socket may be configured for use with other protocols.

[Para 47] Advantages offered include a more secure method of keeping the USB plug mated with the USB-SEA and improved tactile/visual feedback of the positive engagement. As mentioned, embodiments of the invention offer more secure mating arrangements and requires a greater disengagement force to disengage the USB plug from the plug-receiving cavity of the USB-SEA. Since the biasing mechanism (e.g., the coil spring) may be selected to suit the biasing and disengagement force requirements of a particular application, embodiments of the present invention allows the manufacturer to efficiently customize a USB-SEA to a variety of USB devices. Additionally, the positive “snapping” action of the ball into its corresponding aperture as the USB plug is fully inserted into the plug-receiving aperture offers a positive tactile and/or audible feedback to the user, giving the user a heightened sense of confidence that positive engagement has taken place. Still further, the closure of the gap between the plug overmold and the opening of the plug-receiving cavity of the USB-SEA provides a positive visual feedback to the user that positive engagement has taken place.

[Para 48] While this invention has been described in terms of several embodiments, there are alterations, permutations, and equivalents, which fall within the scope of this

invention. For example, although the generally curved protrusion is disclosed in the specific example as a steel ball, such generally curved protrusion may be formed of any suitably hard material, including various metals and plastics. Further, the generally curved protrusion may not be balls at all. As long as the mechanism that engages the aperture has a sloped surface (which may be concave or convex) to allow a force pulling the USB plug and the USB-SEA apart to “slide” the mechanism out of the aperture, positive engagement and disengagement in accordance with principles of the present invention are achieved. For example, a pin with a rounded end may be employed in place of the ball.

[Para 49] As a further example, the biasing mechanism can be any alternative to a coil spring, such as a removable leaf spring, that provides a biasing force to the generally curved protrusion. As a further example, the biasing mechanism does not need to be disposed in the detent mechanism of Fig. 3. As long as the biasing mechanism and the generally curved protrusion are attached to the USB-SEA in some way to allow the generally curved protrusion to engage with the aperture in the USB plug housing, positive engagement and disengagement in accordance with principles of the present invention are achieved.

[Para 50] As a further example, the generally curved protrusion may be made of a suitable non-metallic material if desired. As another example, the metal housing surrounding the plug pins may be replaced by another suitable non-metallic housing. As a further example, the mechanism for positively coupling the plug to the socket (and by extension, the plug-including sub-system to the socket-including sub-system) may be applied to plugs and sockets adapted for use with protocols other than the USB protocol. It should also be noted that there are many alternative ways of implementing the methods and apparatuses of the present invention. It is therefore intended that the following appended claims be interpreted as including all such alterations, permutations, and equivalents as fall within the true spirit and scope of the present invention.

CLAIMS

What is claimed is:

1. A Universal Serial Bus socket-equipped arrangement (USB-SEA) configured for mating with a USB plug having a plug metal housing and an aperture disposed in the plug metal housing, comprising:
 - a plug-receiving cavity configured to receive the USB plug; and
 - a spring-loaded mechanism disposed within the plug-receiving cavity, the spring-loaded mechanism being biased toward an interior region of the plug-receiving cavity and configured to slide along the connector metal housing of the USB plug when the USB plug is inserted into the plug-receiving cavity and to movably mate with the aperture disposed in the plug metal housing when the USB plug is in a terminal mating position with the USB socket assembly, the spring-loaded mechanism representing one of a spring-loaded ball and a spring-loaded pin.
2. The USB-SEA of claim 1 wherein the spring-loaded mechanism is biased by a coil spring toward the interior region of the plug receiving cavity.
3. The USB-SEA of claim 1 wherein the spring-loaded mechanism is configured to impart a human-perceptible tactile sensation when the spring-loaded mechanism transitions from sliding along the surface of the plug metal housing of the USB plug to mating with the aperture.
4. The USB-SEA of claim 1 wherein the spring-loaded mechanism is configured to impart a human-perceptible sound when the spring-loaded mechanism transitions from sliding along the surface of the plug metal housing of the USB plug to mating with the aperture.
5. The USB-SEA of claim 1 further including a lanyard configured to be worn by a human being.

6. The USB-SEA of claim 1 further including a human attachment arrangement that is configured to be worn by a human being.
7. The USB-SEA of claim 1 further including a battery pack and plurality of socket pins disposed in the plug-receiving cavity, the plurality of socket pins being configured to supply power from the battery pack to an electronic device associated with the USB plug when the USB plug is connected with the USB-SEA.
8. The USB-SEA of claim 1 wherein the USB plug is coupled to a portable electronic entertainment device.
9. The USB-SEA of claim 1 further including a display screen arrangement and a plurality of socket pins disposed in the plug-receiving cavity, the plurality of socket pins being configured to communicate video signals between the display screen arrangement and an electronic device associated with the USB plug when the USB plug is connected with the USB-SEA.
10. A Universal Serial Bus (USB) coupling arrangement, comprising:
a portable USB device having a USB plug, the USB plug having therein a plurality of plug pins, the USB plug including plug metal housing surrounding the plurality of plug pins, at least one surface of the plug metal housing having therein an aperture; and
a USB socket-equipped arrangement (USB-SEA) having therein a plug-receiving cavity, the plug-receiving cavity including a spring-loaded mechanism configured to bias against the plug metal housing, the spring-loaded mechanism being one of a spring-loaded ball and a spring-loaded pin, the spring-loaded mechanism being configured to slide along the plug metal housing when the USB plug is inserted into the plug-receiving cavity and to movably mate with the aperture disposed in the plug metal housing when the USB plug is in a terminal mating position with the plug-receiving cavity.
11. The USB coupling arrangement of claim 10 wherein the spring-loaded mechanism is biased by a coil spring toward the interior region of the plug receiving cavity.

12. The USB coupling arrangement of claim 10 wherein the spring-loaded mechanism is configured to impart a human-perceptible tactile sensation when the spring-loaded mechanism transitions from sliding along the surface of the plug metal housing of the USB plug to mating with the aperture.
13. The USB coupling arrangement of claim 10 wherein the spring-loaded mechanism is configured to impart a human-perceptible sound when the spring-loaded mechanism transitions from sliding along the surface of the plug metal housing of the USB plug to mating with the aperture.
14. The USB coupling arrangement of claim 10 further including a lanyard configured to be worn by a human being.
15. The USB coupling arrangement of claim 10 further including a human attachment arrangement that is configured to be worn by a human being.
16. The USB coupling arrangement of claim 10 wherein the USB-SEA includes a battery pack and plurality of socket pins disposed in the plug-receiving cavity, the plurality of socket pins being configured to supply power from the battery pack to the portable USB device associated with the USB plug when the USB plug is connected with the USB-SEA.
17. The USB coupling arrangement of claim 10 wherein the USB plug is coupled to a portable electronic entertainment device.
18. The USB coupling arrangement of claim 10 wherein the USB-SEA includes a display screen arrangement and a plurality of socket pins disposed in the plug-receiving cavity, the plurality of socket pins being configured to communicate video signals between the display screen arrangement and the portable USB device associated with the USB plug when the USB plug is connected with the USB-SEA.
19. A Universal Serial Bus (USB) coupling arrangement, comprising:
a USB plug having therein a plurality of plug pins, the USB plug including plug metal housing surrounding the plurality of plug pins, the plug metal housing including a

pair of first parallel surfaces and a pair of second parallel surfaces disposed perpendicular to the first parallel surfaces, a surface of the pair of second parallel surfaces being smaller than a surface of the pair of first parallel surfaces, at least one surface of the pair of second parallel surfaces having therein an aperture; and

a USB socket-equipped arrangement (USB-SEA) having therein a plug-receiving cavity, the plug-receiving cavity including at least a first generally curved protrusion that is spring-loaded to bias against the plug metal housing, the first generally curved protrusion being configured to slide along the plug metal housing when the USB plug is inserted into the plug-receiving cavity and to movably mate with the aperture disposed in the plug metal housing when the USB plug is in a terminal mating position with the plug-receiving cavity.

20. The USB coupling arrangement of claim 19 wherein the first generally curved protrusion represents a portion of a spring-loaded ball.

21. The USB coupling arrangement of claim 19 wherein a spring biased against the first generally curved protrusion is compressed to a first degree of compression when the first generally curved protrusion slides along the at least one surface of the pair of second parallel surfaces, the spring being compressed to a second degree of compression that is lower than the first degree of compression when the first generally curved protrusion mates with the aperture.

22. The USB coupling arrangement of claim 19 wherein at least one of a stiffness of the spring and a material chosen for the first generally curved protrusion is configured to impart a human-perceptible tactile sensation when the spring-loaded ball transitions from sliding along the at least one surface of the second pair of parallel surfaces to mating with the aperture.

23. The USB coupling arrangement of claim 21 wherein at least one of a stiffness of the spring and a material chosen for the first generally curved protrusion is configured to impart a human-perceptible sound when the spring-loaded ball transitions from sliding along the at least one surface of the second pair of parallel surfaces to mating with the aperture.

24. The USB coupling arrangement of claim 19 wherein the USB plug is part of an electronic entertainment device configured to play electronically stored music.
25. The USB coupling arrangement of claim 24 wherein the USB-SEA represents a lanyard cap.
26. The USB coupling arrangement of claim 24 wherein the USB-SEA represents a human attachment arrangement that is configured to be worn by a human being.
27. The USB coupling arrangement of claim 24 wherein the USB-SEA is a battery pack.
28. The USB coupling arrangement of claim 19 wherein the USB plug is part of an electronic image-capturing device.
29. The USB coupling arrangement of claim 27 wherein the USB-SEA represents a lanyard cap.
30. The USB coupling arrangement of claim 27 wherein the USB-SEA represents a human attachment arrangement that is configured to be worn by a human being.
31. The USB coupling arrangement of claim 27 wherein the USB-SEA represents a battery pack.
32. The USB coupling arrangement of claim 19 wherein the first generally curved protrusion represents one end of a spring-loaded pin.
33. The USB coupling arrangement of claim 19 wherein the first generally curved protrusion is biased against the at least one of the pair of second parallel surfaces by a coil spring.

34. The USB coupling arrangement of claim 19 wherein the first generally curved protrusion is biased against the at least one of the pair of second parallel surfaces by a leaf spring.

35. The USB coupling arrangement of claim 19 wherein the plug-receiving cavity further includes a second generally curved protrusion configured to mate with another aperture disposed in another one of the pair of second parallel surfaces.

36. A portable electronic system, comprising:

a portable electronic device having a first plug, the first plug having therein a plurality of plug pins, the first plug including plug housing surrounding the plurality of plug pins, at least one surface of the plug housing having therein an aperture; and

a first socket-equipped arrangement (SEA) having therein a plug-receiving cavity, the plug-receiving cavity including a spring-loaded mechanism configured to bias against the plug housing, the spring-loaded mechanism being one of a spring-loaded ball and a spring-loaded pin, the spring-loaded mechanism being configured to slide along the plug housing when the first plug is inserted into the plug-receiving cavity and to movably mate with the aperture disposed in the plug housing when the first plug is in a terminal mating position with the plug-receiving cavity.

37. The portable electronic system of claim 36 wherein the spring-loaded mechanism is biased by a coil spring toward the interior region of the plug receiving cavity.

38. The portable electronic system of claim 36 wherein the spring-loaded mechanism is configured to impart a human-perceptible tactile sensation when the spring-loaded mechanism transitions from sliding along the surface of the plug housing of the first plug to mating with the aperture.

39. The portable electronic system of claim 36 wherein the spring-loaded mechanism is configured to impart a human-perceptible sound when the spring-loaded mechanism transitions from sliding along the surface of the plug housing of the first plug to mating with the aperture.

40. The portable electronic system of claim 36 further including a lanyard configured to be worn by a human being.

41. The portable electronic system of claim 36 further including a human attachment arrangement that is configured to be worn by a human being.

42. The portable electronic system of claim 36 wherein the SEA includes a battery pack and plurality of socket pins disposed in the plug-receiving cavity, the plurality of socket pins being configured to supply power from the battery pack to the portable electronic device associated with the first plug when the first plug is connected with the SEA.

43. The portable electronic system of claim 36 wherein the first plug represents a USB plug.

44. The portable electronic system of claim 36 wherein the SEA includes a display screen arrangement and a plurality of socket pins disposed in the plug-receiving cavity, the plurality of socket pins being configured to communicate video signals between the display screen arrangement and the portable electronic device associated with the first plug when the first plug is connected with the SEA.

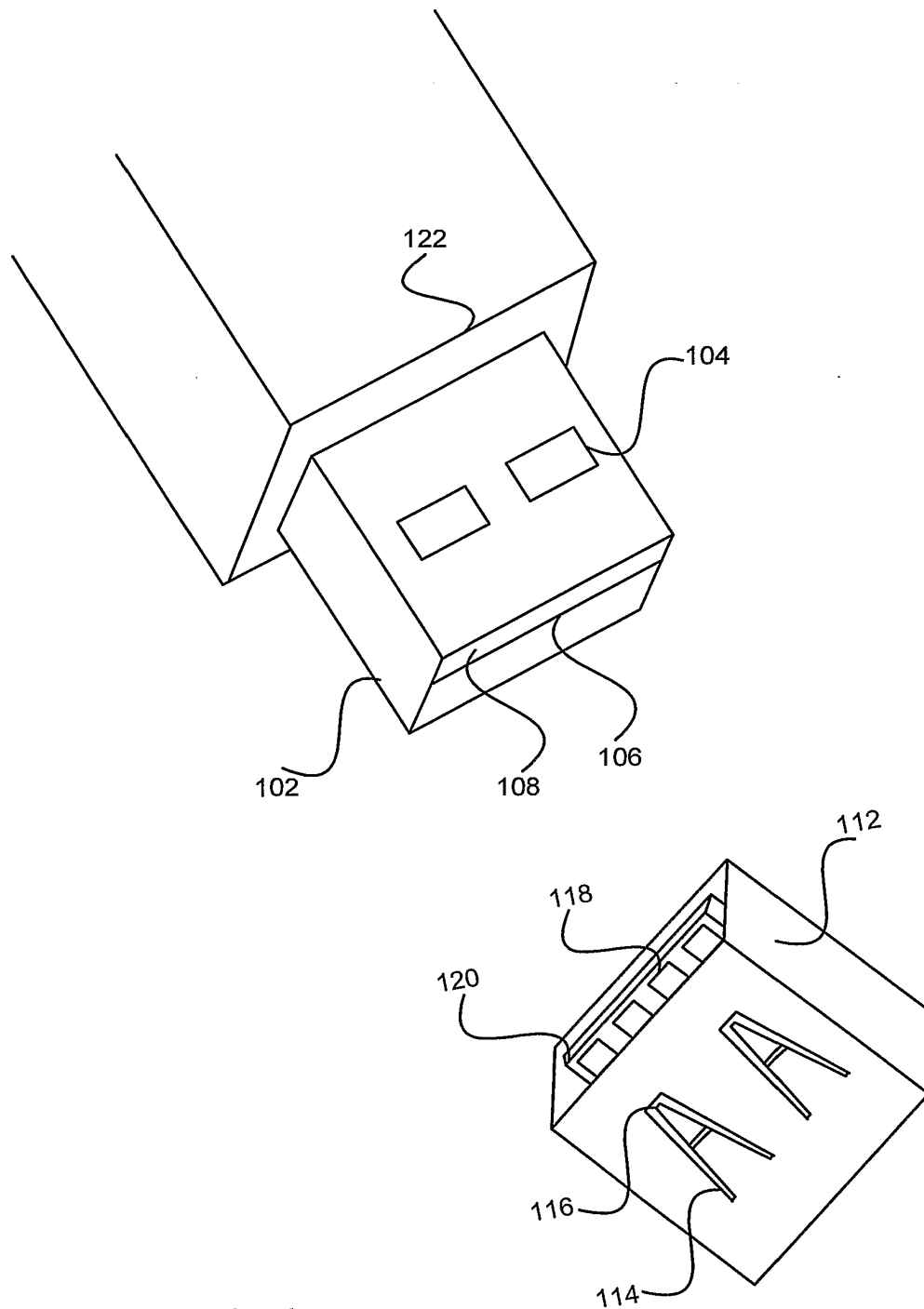


FIG. 1

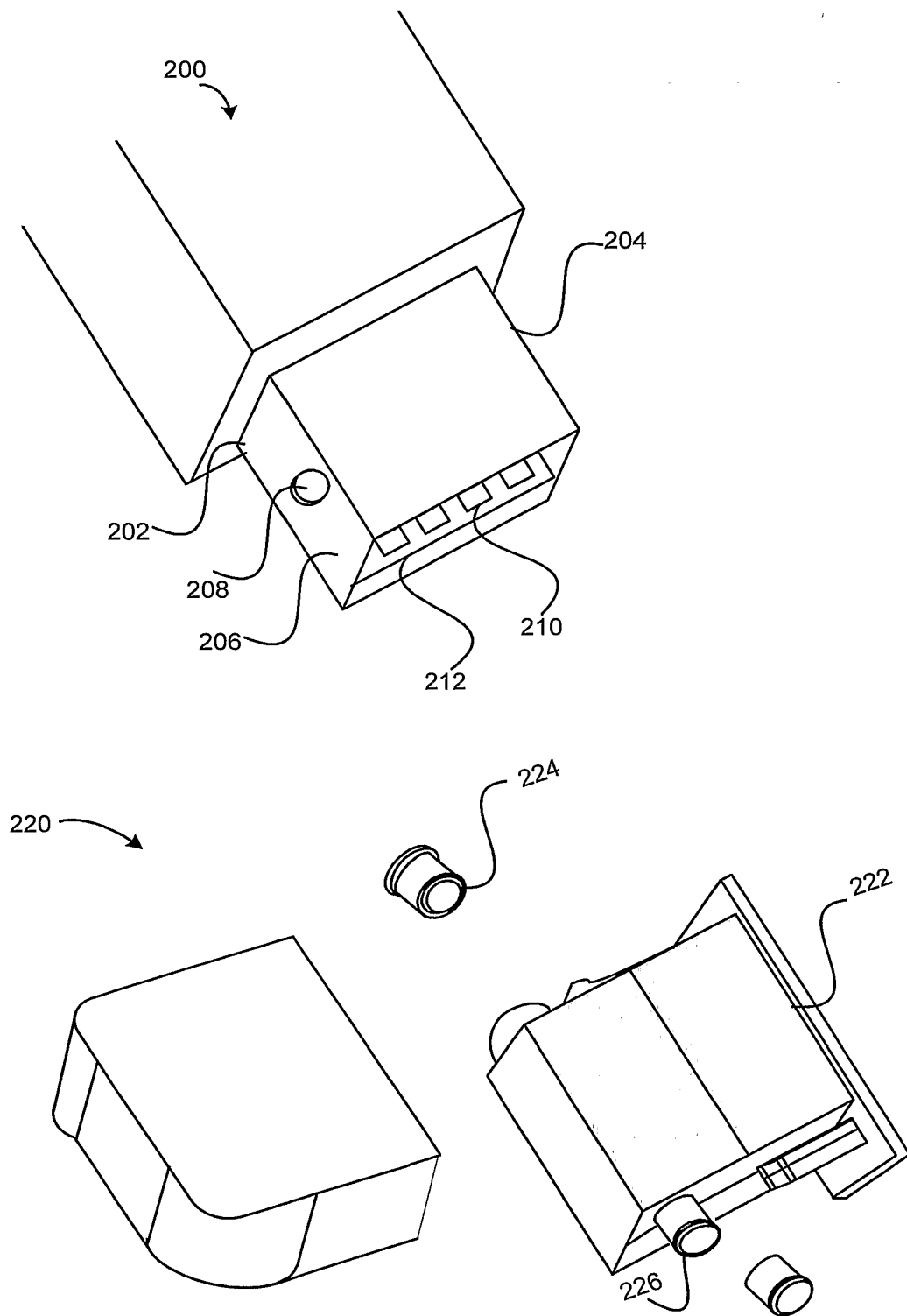


FIG. 2

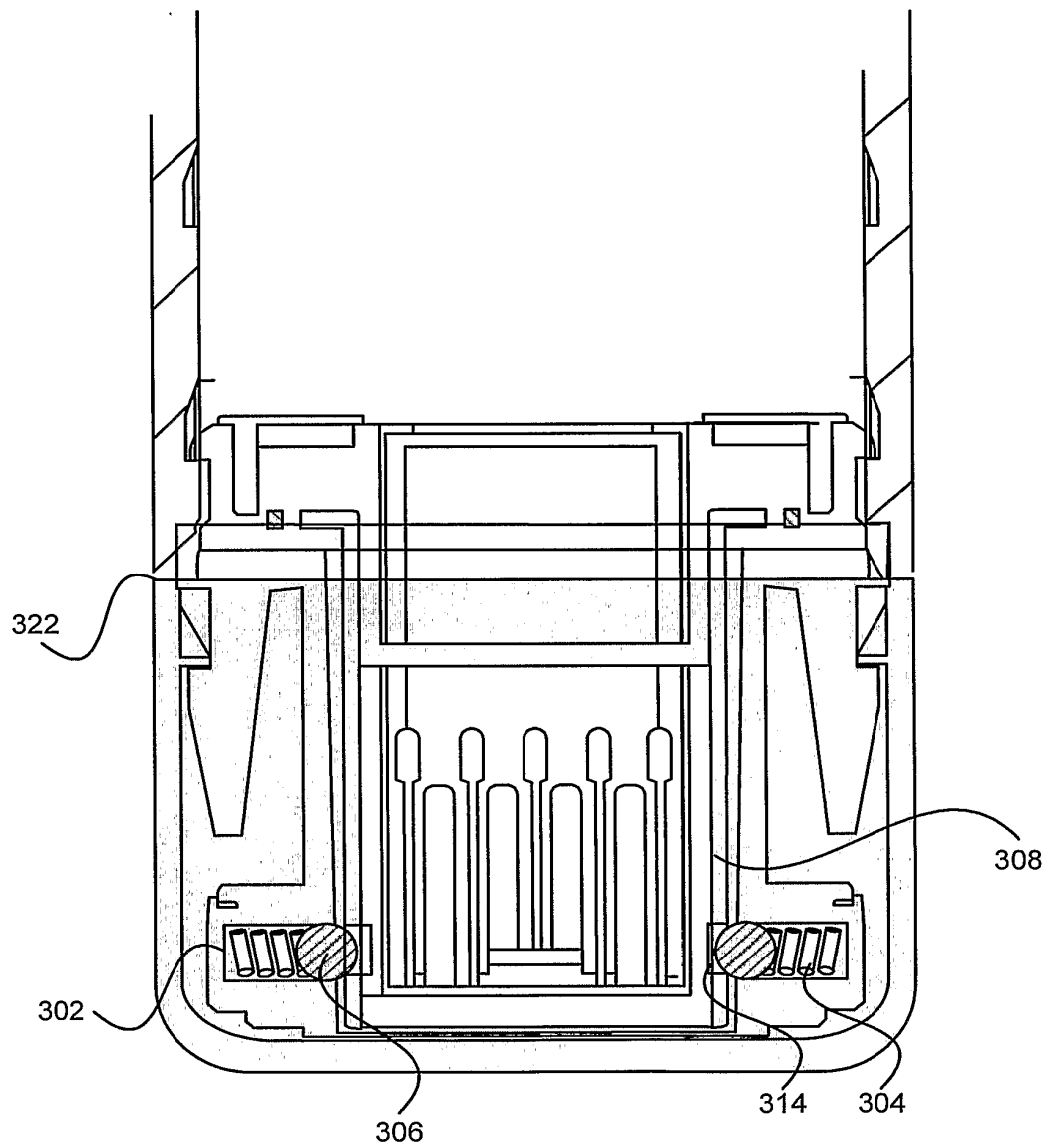


FIG. 3

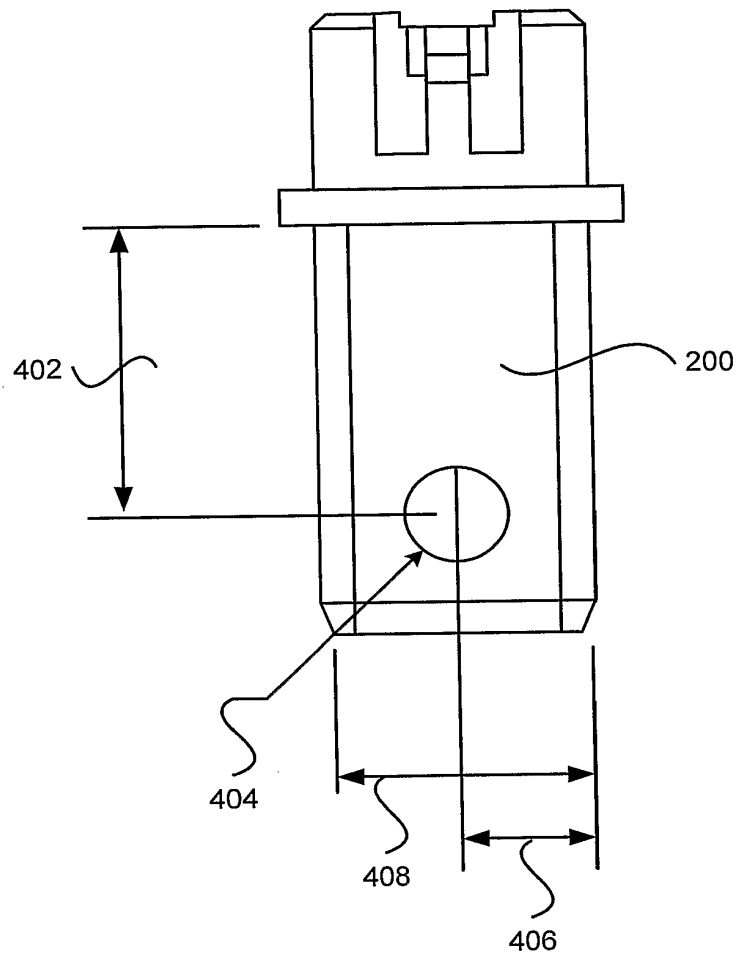


FIG. 4

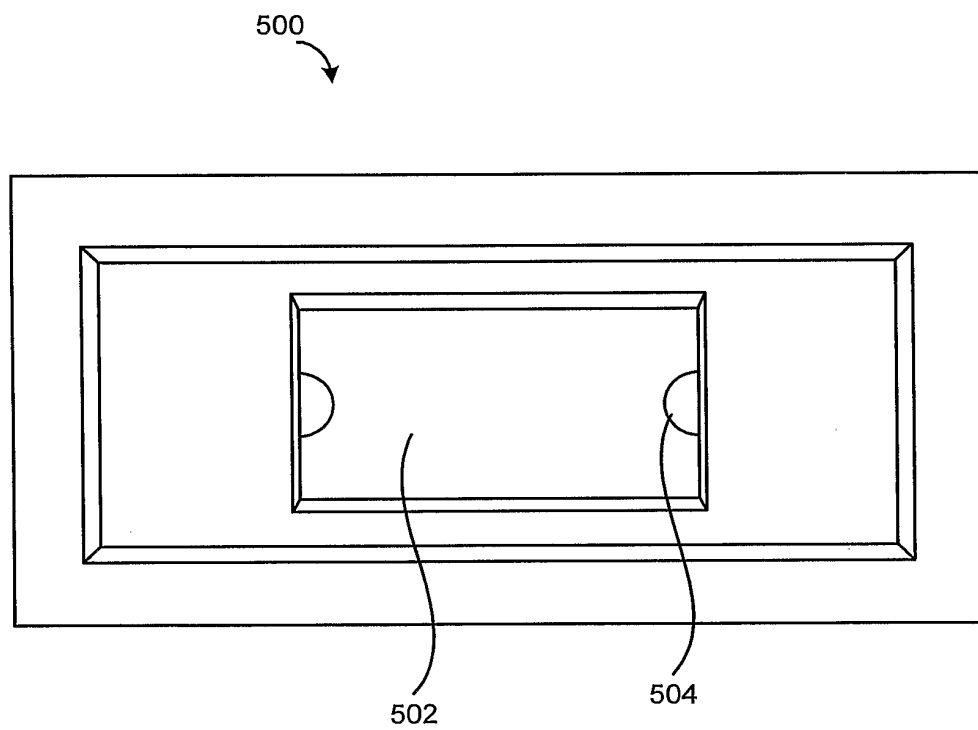


FIG. 5

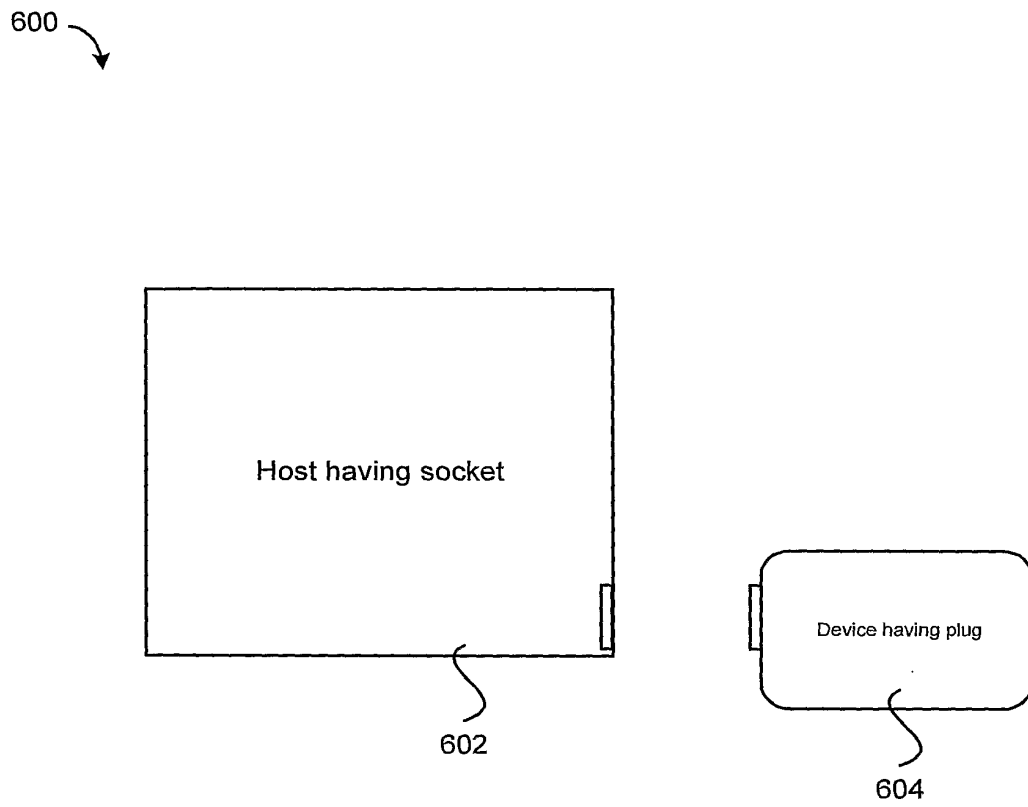


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/000427

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01R13/627

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

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 practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 1 482 601 A (TYCO ELECTRONICS AMP K.K.) 1 December 2004 (2004-12-01) abstract; claims; figures	19 1-18, 20-44
A	EP 0 738 029 A (MOLEX INCORPORATED) 16 October 1996 (1996-10-16) abstract; claims; figures	1-44
A	US 5 772 461 A (YU ET AL) 30 June 1998 (1998-06-30) abstract; claims; figures	1-44
A	US 5 658 170 A (TAN ET AL) 19 August 1997 (1997-08-19) abstract; claims; figures	1-44
	-/--	

☒ 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
"E" earlier document but published on or after the international filing date
"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

21 April 2006

Date of mailing of the international search report

12/05/2006

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Durand, F

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/000427

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 610 496 A (SCHWARTZ ET AL) 9 September 1986 (1986-09-09) abstract; claims; figures -----	1-44
A	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 12, 5 December 2003 (2003-12-05) & JP 2003 282178 A (MITSUMI ELECTRIC CO LTD), 3 October 2003 (2003-10-03) abstract -----	1, 10, 19, 36

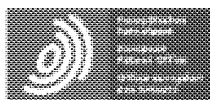
INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/000427

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1482601	A	01-12-2004	CN 1574494 A	02-02-2005
			JP 2005011791 A	13-01-2005
			TW 255549 Y	11-01-2005
			US 2004242070 A1	02-12-2004
EP 0738029	A	16-10-1996	CN 1140348 A	15-01-1997
			DE 69601240 D1	11-02-1999
			DE 69601240 T2	09-09-1999
			JP 2887579 B2	26-04-1999
			JP 8273760 A	18-10-1996
			KR 215500 B1	16-08-1999
			SG 50616 A1	20-07-1998
			US 5580268 A	03-12-1996
US 5772461	A	30-06-1998	NONE	
US 5658170	A	19-08-1997	NONE	
US 4610496	A	09-09-1986	NONE	
JP 2003282178	A	03-10-2003	NONE	



Espacenet

Bibliographic data: CN201402876 (Y) — 2010-02-10**Two rows of cross-arrayed continuous terminal structure**

Inventor(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)
Applicant(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)
Classification: - **international:** *H01R13/02; H01R43/16*
- **cooperative:**
Application number: CN20092008504U 20090316
Priority number(s): CN20092008504U 20090316

Abstract of CN201402876 (Y)

The utility model relates to two rows of continuous terminal structure which are arrayed in cross, comprising a first row of continuous terminal and a second row of continuous terminal; wherein the first row of continuous terminal is provided with a plurality of first terminals and a first material belt; the first terminal is provided with a pin connecting part, a middle part and a contacting part, wherein the pin connecting part of the first terminal and the first material belt are connected with each other and are arrayed at equal interval. The second row of continuous terminal is provided with a plurality of second terminals and a second material belt; the second terminal is provided with a pin connecting part, a middle part, a stretching part and a contacting part, wherein the pin connecting part of the second terminal and the second material belt are connected with each other and are arrayed at equal interval; the terminals of the second row of continuous terminal are arrayed on the gaps of the terminals of the first row of continuous terminal in an opposite inserting way, so that the first terminals and the second terminals are arrayed in cross, and the first material belt and the second material belt are respectively arranged on the two ends of the first terminal and the second terminal. The contacting part of the first terminal is connected with the second material belt, and the contacting part of the second terminal is connected with the first material belt. The utility model has the advantages of saving material; and the whole two rows of continuous terminal are further stable, and no material cuttings are produced.

[19] 中华人民共和国国家知识产权局

[51] Int. Cl.

H01R 13/02 (2006.01)

H01R 43/16 (2006.01)



[12] 实用新型专利说明书

专利号 ZL 200920008504.2

[45] 授权公告日 2010 年 2 月 10 日

[11] 授权公告号 CN 201402876Y

[22] 申请日 2009.3.16

[21] 申请号 200920008504.2

[73] 专利权人 蔡周贤

地址 中国台湾台北县

[72] 发明人 蔡周贤

[74] 专利代理机构 永新专利商标代理有限公司

代理人 李树明

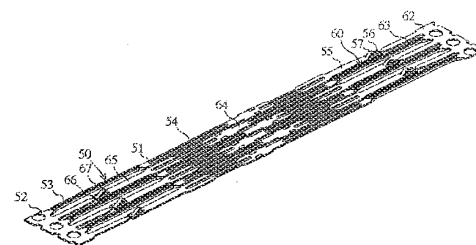
权利要求书 1 页 说明书 4 页 附图 4 页

[54] 实用新型名称

交叉排列的两排连续端子构造

[57] 摘要

一种交叉排列的两排连续端子构造，包括：第一排连续端子，设有多个第一端子及一第一料带，该第一端子设有接脚部、中间部及接触部，第一端子的接脚部与第一料带相连而呈等间隔排列；及第二排连续端子，设有多个第二端子及一第二料带，该第二端子设有接脚部、中间部、延伸部及接触部，第二端子的接脚部与第二料带相连而呈等间隔排列，该第二排连续端子的各端子对插排列于第一排连续端子的端子间隙，使第一端子和第二端子成交叉排列且第一、二料带分别位于第一、二端子的二端；该第一端子的接触部与该第二料带相连，该第二端子的接触部与该第一料带相连。本实用新型的可达到端子制造上节省材料、整体二排连续端子甚为平稳、及不会产生料屑。



1. 一种交叉排列的两排连续端子构造，其是以一金属板片冲压制成，所述交叉排列的两排连续端子构造包括有：

一第一排连续端子，其设有多个第一端子及一第一料带，该第一端子由一端延伸至另一端依序设有一接脚部、一中间部、一延伸部及一接触部，该每一第一端子的接脚部与第一料带相连而呈等间隔排列；及

一第二排连续端子，其设有多个第二端子及一第二料带，该第二端子由一端延伸至另一端依序设有一接脚部、一中间部、一延伸部及一接触部，该每一第二端子的接脚部与第二料带相连而呈等间隔排列，该第二排连续端子的各端子对插排列于第一排连续端子的端子间隙，而使第一端子和第二端子成交叉排列且第一、二料带分别位于第一、二端子的二端；

其特征在于：该第一端子的接触部与该第二料带相连，该第二端子的接触部与该第一料带相连。

2. 如权利要求 1 所述的交叉排列的两排连续端子构造，其特征在于：该第一端子及第二端子的接触部可弹动且设有一凸出板面的接点。
3. 如权利要求 2 所述的交叉排列的两排连续端子构造，其特征在于：该第一端子及第二端子的接点由接触部的板面刺破凸出。
4. 如权利要求 1 所述的交叉排列的两排连续端子构造，其特征在于：该第一端子的接触部位于该第二端子的接脚部内侧，该第二端子的接触部位于第一端子的接脚部内侧。
5. 如权利要求 1 所述的交叉排列的两排连续端子构造，其特征在于：该第一端子及第二端子的形状相同。

交叉排列的两排连续端子构造

【技术领域】

本实用新型是关于一种电连接器的端子构造，特别是关于一种交叉排列的两排连续端子构造。

【背景技术】

请参阅图1及图2，为一种现有对插冲压而呈交叉排列的两排连续端子构造，其是以一金属板片冲压制成，其包括有：一第一排连续端子20、一第二排连续端子30、及一中间料带40，其中：

该第一排连续端子20设有多个第一端子21及一第一料带22，该第一端子21由一端直线延伸至另一端依序设有一接脚部23(打斜线表示)、一中间部24及一弹动部25，该弹动部的板面刺破凸出设有一接点26，该每一第一端子21的接脚部23与第一料带22相连而呈等间隔排列。

该第二排连续端子30设有多个第二端子31及一第二料带32，该第二端子31由一端直线延伸至另一端依序设有一接脚部33(打斜线表示)、一中间部34及一弹动部35，该弹动部35设有一凸出的接点36，该每一第二端子31的接脚部33与第二料带32相连而呈等间隔排列，该第一端子21及第二端子31的形状相同。

该第二排连续端子30是由弹动部35对插于第一排连续端子20的端子间隙，而使第一、二料带22、32分别位于第一、二端子21、31的二端。

该中间料带40连接于该多个第一、二端子21、31的中间部24、34，使相邻接的第一、二端21、31子相互连结。

现有构造借由中间料带40使相邻接的第一、二端21、31子相互连结，如此可达到端子制造上节省材料且整体二排连续端子甚为平稳，端子在冲压、电镀及搬运上均甚为稳定。

然而上述现有构造亦有缺失，即：制造完成的二排连续端子要组装于电连接器的塑胶座体时，必需先切掉该中间料带40才能分开二排连续端子，

该中间料带40切掉后会造成很多料屑，在加工上造成困扰。

【实用新型内容】

本实用新型的主要目的在于提供一种交叉排列的两排连续端子构造，其可达到端子制造上节省材料、整体二排连续端子甚为平稳、及不会产生料屑。

本实用新型的次要目的在于提供一种交叉排列的两排连续端子构造，使可达到连结一起的二排连续端子在电镀上可一次性加工，而不需先分开再电镀。

为达上述目的，本实用新型交叉排列的两排连续端子构造是以一金属板片冲压制成，其包括有：一第一排连续端子，其设有多个第一端子及一第一料带，该第一端子由一端延伸至另一端依序设有一接脚部、一中间部及一接触部，该每一第一端子的接脚部与第一料带相连而呈等间隔排列；及一第二排连续端子，其设有多个第二端子及一第二料带，该第二端子由一端延伸至另一端依序设有一接脚部、一中间部、一延伸部及一接触部，该每一第二端子的接脚部与第二料带相连而呈等间隔排列，该第二排连续端子的各端子是对插排列于第一排连续端子的端子间隙；而使第一端子和第二端子成交叉排列且第一、二料带分别位于第一、二端子的二端；其特征在于该第一端子的接触部与该第二料带相连，该第二端子的接触部与该第一料带相连。

本实用新型交叉排列的两排连续端子构造的优点在于可使整体的两排连续端子甚为平稳更加易于冲压加工，两排连续端子分开时不会产生料屑，不会造成制造加工的困扰。

本实用新型的上述及其他目的、优点和特色由以下较佳实施例的详细说明中并参考图式当可更加明白，其中：

【附图说明】

图1 是现有对插冲压的两排连续端子的上视图。

图2 是现有对插冲压的两排连续端子的侧视图。

图3 是本实用新型第一实施例的立体图。

图4 是本实用新型第一实施例的二排连续端子切开的立体图。

图5 是本实用新型第一实施例的二排连续端子拉开的立体图。

图6 是本实用新型第一实施例的一排连续端子弯折的立体图。

图7 是本实用新型第二实施例的立体图。

第一排连续端子 20	第一端子 21	第一料带 22	
接脚部 23	中间部 24	弹动部 25	
接点 26	第二排连续端子 30	第二端子 31	
第二料带 32	接脚部 33	中间部 34	弹动部 35
接点 36	中间料带 40		
第一排连续端子 50	第一端子 51	第一料带 52	
接脚部 53	中间部 54	延伸部 55	
接触部 56	接点 57	第二排连续端子 60	第二端子
61	第二料带 62	接脚部 63	
中间部 64	延伸部 65	接触部 66	接点 67

【具体实施方式】

请参阅图3，本实用新型是以一金属板片冲压制成，包括有：一第一排连续端子50及一第二排连续端子60，其中：

该第一排连续端子 50 设有多个第一端子 51 及一第一料带 52，该第一端子 51 由一端直线延伸至另一端依序设有一接脚部 53、一中间部 54、一延伸部 55 及一接触部 56，该接触部 56 的板面刺破凸出设有一接点 57，该每一第一端子 51 的接脚部 53 与第一料带 52 相连而呈等间隔排列。

该第二排连续端子 60 设有多个第二端子 61 及一第二料带 62，该第二端子 61 由一端直线延伸至另一端依序设有一接脚部 63、一中间部 64、一延伸部 65 及一接触部 66，该接触部 66 设有一凸出的接点 67，该每一第二端子 61 的接脚部 63 与第二料带 62 相连而呈等间隔排列，该第一端子 51 及第二端子 61 的形状相同。

该第二排连续端子 60 是由接触部 66 对插入第一排连续端子 50 的端子间隙，而使第一、二料带 52、62 分别位于第一、二端子 51、61 的二端；本实用新型的特征在于该第一端子 51 的接触部 56 与该第二料带 62 相连，该第二端子 61 的接触部 66 与该第一料带 52 相连，如此第一、二端子 51、61 的二端均借由第一、二料带 52、62 相连，可达到非常稳固，另外，该第

一端子 50 的接触部 56 位于该第二端子 60 的接脚部 63 内侧, 该第二端子 60 的接触部 66 位于第一端子 50 的接脚部 53 内侧, 如此可达到连结一起的二排连续端子在电镀上可一次性加工, 而不需先分开再电镀。

请参阅图4, 当电镀完成后要组装于电连接器的塑胶座体时, 需先分开第一、二排连续端子50、60, 此时将各第一端子51的接触部56与第二料带62连接处切开且同时将该接触部56上压形成向上的溢压, 同样也将各第二端子61的接触部66与第一料带52连接处切开且同时将该接触部66下压形成向下的溢压, 如此即使该第一、二排连续端子50、60分开; 请参阅图5, 再将该第一、二排连续端子50、60拉开; 请参阅图6, 将该第一排连续端子50的各第一端子51的中间部54弯折90度, 同样将该第二排连续端子60的各第二端子61的中间部64弯折90度。

借由以上构造, 本实用新型有以下优点:

1. 第二排连续端子60是对插于第一排连续端子50的端子间距中而成交叉排列的两排连续端子, 故在制造上可省一倍材料, 且借第一、二端子51、61借由第一、二料带52、62相连, 如此可使整体的两排连续端子甚为平稳更加易于冲压加工。

2. 冲压完成的两排连续端子在运送至电镀厂过程亦较为稳定, 且一次性作两排连续端子的电镀, 加工效率提升一倍, 由于该第一端子 51 的接触部 56 位于第二端子 61 的接脚部 63 内侧, 该第二端子 61 的接触部 66 位于第一端子 51 的接脚部 53 内侧, 故两排端子的接脚部以浸镀方式镀锡时不致干涉到接触部的接点镀金。

3. 本实用新型的两排连续端子分开时不会产生料屑, 不会造成制造加工的困扰。

请参阅图7, 为本实用新型的第二实施例, 其大致与第一实施例相同, 其差异在于本实施的端子较短, 该第一端子51的接触部56位于第二端子61的接脚部63外侧, 该第二端子61的接触部66位于第一端子51的接脚部53外侧, 由于此类型端子因形状需求如此安排较为节省材料, 然而在电镀上, 两排端子的接脚部无法以浸镀方式镀锡。

在较佳实施例的详细说明中所提出的具体的实施例仅为了易于说明本实用新型的技术内容, 而并非将本实用新型狭义地限制于该实施例, 在不超出本实用新型的精神及申请专利范围的情况, 可作种种变化实施。

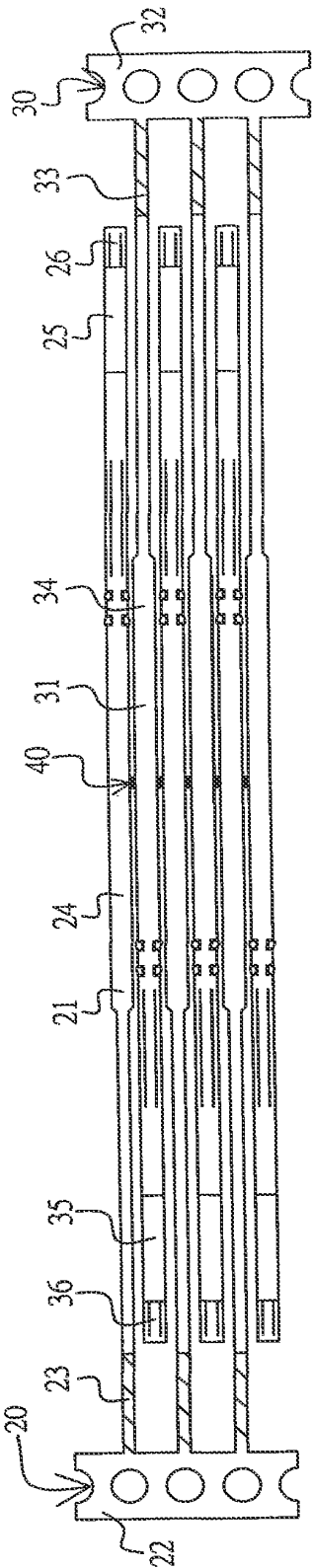


图 1

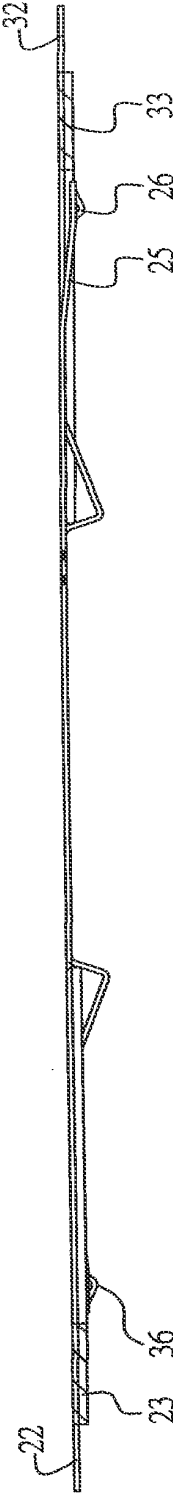
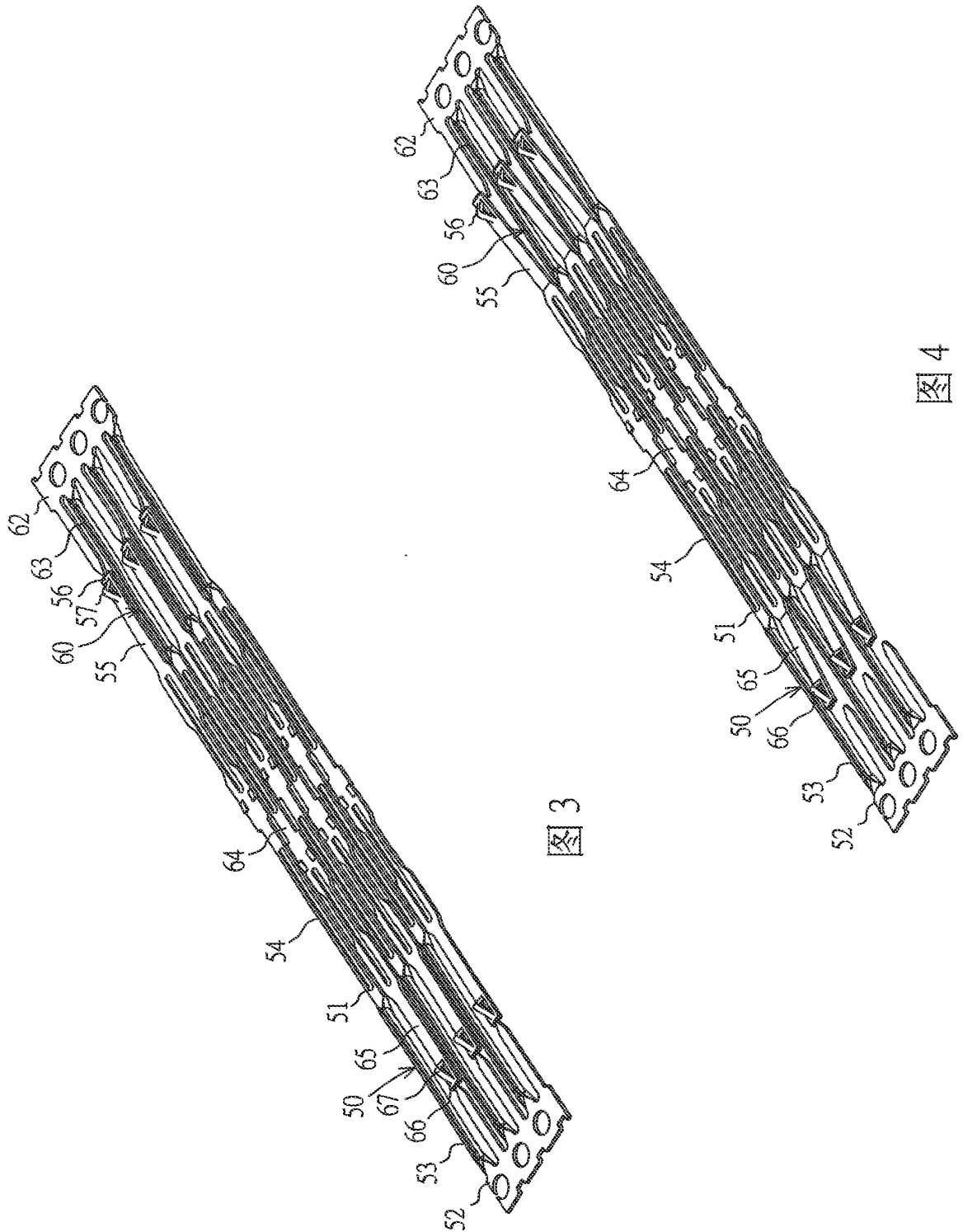


图 2



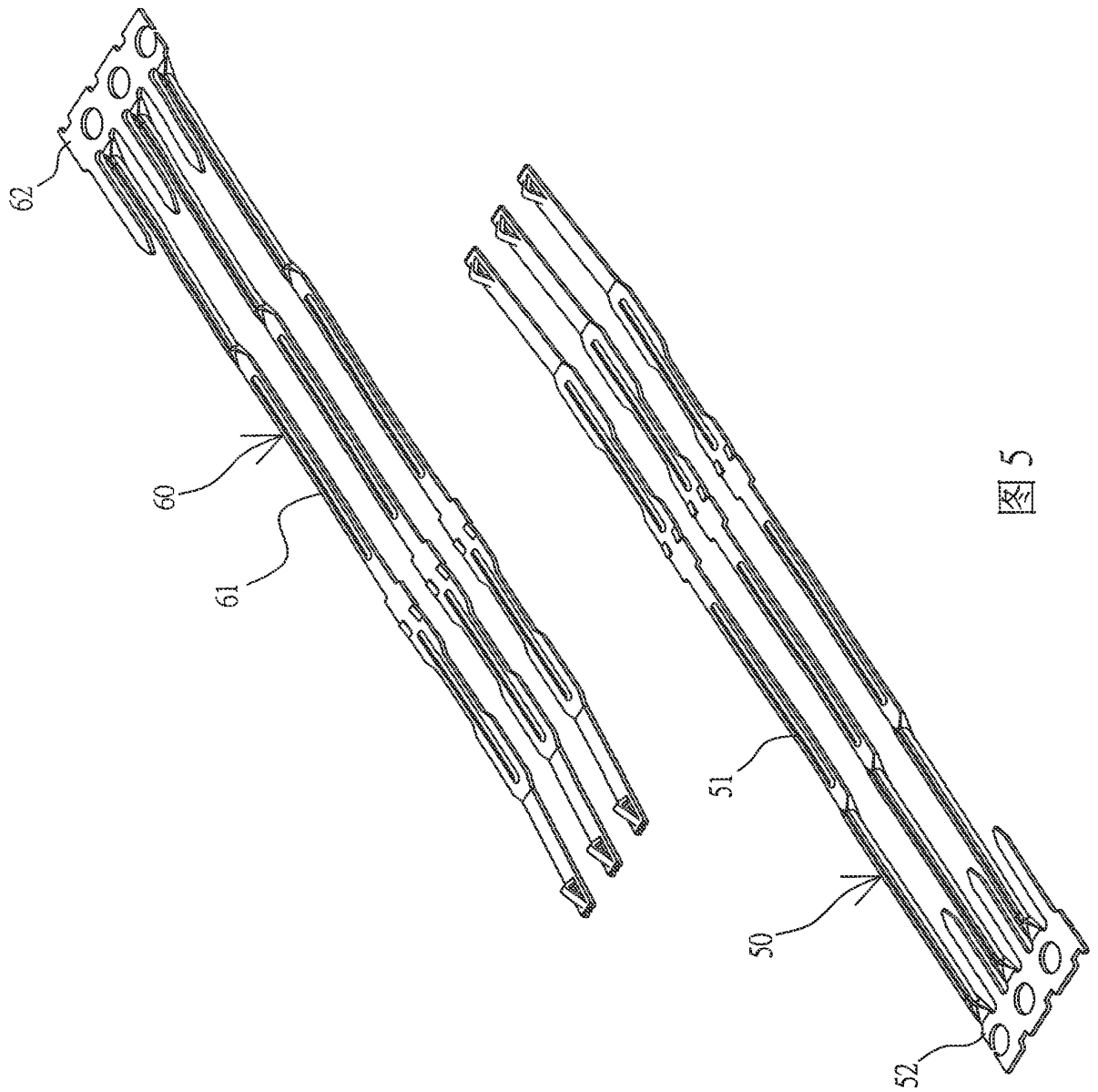


图5

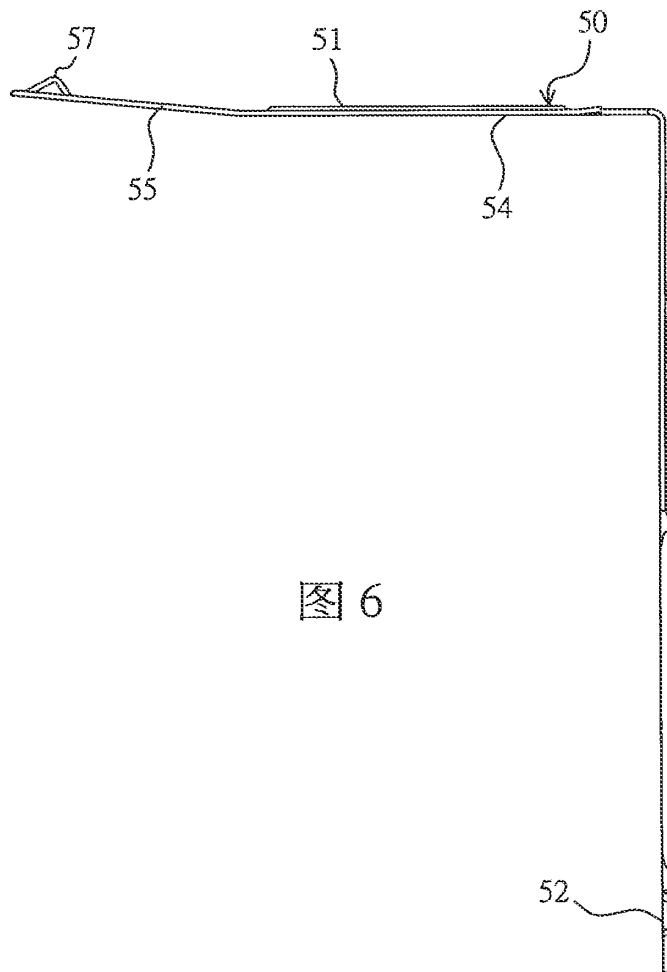


图 6

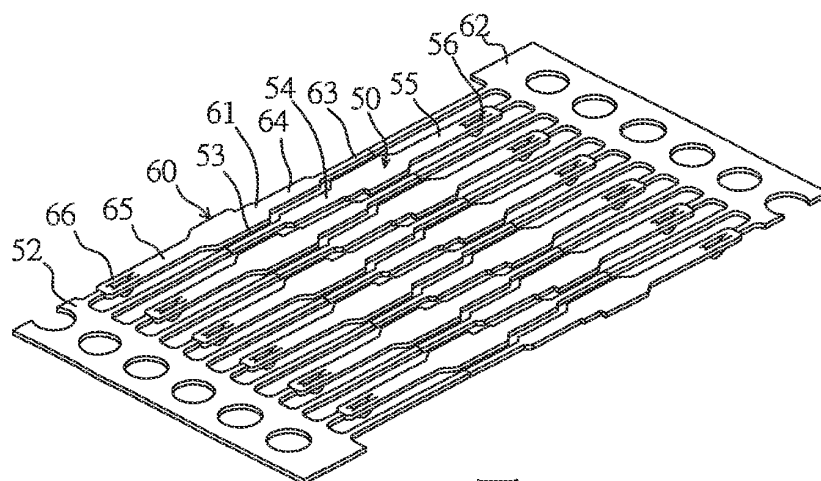
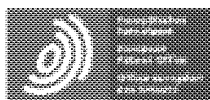


图 7



Espacenet

Bibliographic data: CN201515090 (U) — 2010-06-23**Product structure with driving and reversing device**

Inventor(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)
Applicant(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)
Classification: - **international:** *H01R13/502; H01R13/629*
- **cooperative:**
Application number: CN200920158435U 20090603
Priority number(s): CN200920158435U 20090603

Abstract of CN201515090 (U)

The utility model relates to a product structure with a driving and reversing device, which comprises a base body and the driving and reversing device. The driving and reversing device comprises a machine core, a slide piece, a guide rod and an elastic component, wherein the machine core is provided with a slide groove, the slide groove adopts a circulating path and is provided with a depressed positioning point, a starting point is arranged at the other end of the slide groove, and a plurality of unidirectional stop blocks are arranged at the bottom of the slide groove, so that a unidirectional circulation is formed from the starting point to the positioning point to the starting point; the slide piece transversely slides oppositely to the base and is provided with a propping part; one end of the guide rod is clamped in the slide groove of the machine core and can slide along the circulating path; the elastic component provides the elasticity for causing the elastic component to be returned to the original position after the slide piece moves to the base body. The machine core of the driving and reversing device and the slide piece are bent and formed by a metal sheet body to form a slide piece machine core; and the other end of the guide rod is positioned on the base body. The slide piece and the machine core of the driving and reversing device are formed by integrally bending the metal sheet, so that the effects of duration and simple manufacture are achieved.



(12) 实用新型专利

(10) 授权公告号 CN 201515090 U

(45) 授权公告日 2010.06.23

(21) 申请号 200920158435.3

(22) 申请日 2009.06.03

(73) 专利权人 蔡周贤

地址 中国台湾台北县

(72) 发明人 蔡周贤

(74) 专利代理机构 永新专利商标代理有限公司
72002

代理人 李树明

(51) Int. Cl.

H01R 13/629 (2006.01)

H01R 13/502 (2006.01)

H01R 12/16 (2006.01)

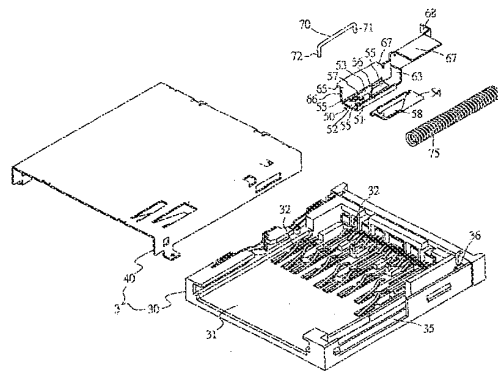
权利要求书 1 页 说明书 5 页 附图 9 页

(54) 实用新型名称

具进退装置的产品构造

(57) 摘要

一种具进退装置的产品构造,其包括:一座体;及一进退装置,其包括有:一机心,其设有一滑槽,该滑槽呈一循环路径,该滑槽设有一凹陷的定位点,而另一端设有一起始点,且其底面设有总数的单向挡块,借以使由起始点→定位点→起始点形成单向循环;一滑片,其可相对于该座体作前后滑动,其设有一抵推部;一导引杆,该导引杆一端卡入该机心的滑槽且可顺着该循环路径滑动;及一弹性元件,其是提供该滑片向座体内移动后再回复原位的弹力;其中,该进退装置的机心与滑片是由一金属片体弯折成型而成一滑片机心,该导引杆的另一端定位于该座体。本实用新型将进退装置的滑片和机心以金属片一体弯折形成,达到耐用且制造简便的效果。



1. 一种具进退装置的产品构造,包括:

一座体;及

一进退装置,包括有:一机心,其设有一滑槽,该滑槽呈一循环路径,该滑槽设有一凹陷的定位点,而另一端设有一起始点,且其底面设有多个单向挡块,借以使由起始点→定位点→起始点形成单向循环;一滑片,能够相对于该座体作前后滑动,其设有一抵推部;一导引杆,该导引杆一端卡入该机心的滑槽且能够顺着该循环路径滑动;及一弹性元件,其是提供该滑片向座体内移动后再回复原位的弹力;

其特征在于:该进退装置的机心与滑片是由一金属片一体弯折成型而成一滑片机心,该导引杆的另一端定位于该座体。

2. 如权利要求1所述的具进退装置的产品构造,其特征在于:该产品构造为一电连接器,该座体内设有一连接槽及至少一排端子。

3. 如权利要求2所述的具进退装置的产品构造,其特征在于:该座体设有一塑胶底座及一上盖,该上盖盖合于塑胶底座上。

4. 如权利要求2所述的具进退装置的产品构造,其特征在于:该塑胶底座一侧设有组装槽,该进退装置组装于该组装槽,该滑片机心设有一抵靠部,该弹性元件一端定位于座体,另一端抵于该抵靠部。

5. 如权利要求3所述的具进退装置的产品构造,其特征在于:该上盖为金属材质。

6. 如权利要求1所述的具进退装置的产品构造,其特征在于:该机心设有:一底板、一内轨迹板、一外轨迹板及多个单向挡块,该内轨迹板是由底板的板面冲压凸出,其一端呈尖端,而另一端呈近M形而形成该凹陷的定位点,该外轨迹板是弯折位于该底板的内侧且两者呈平行,该外轨迹板设有一开孔将该内轨迹板包围于内,该内、外轨迹板之间形成该滑槽,该外轨迹板的开孔一端对应内轨迹板的尖端形成该起始点,开孔另一端呈近M形对应该内轨迹板的近M形一端,使该端形成一中间凸部及二凹部,该二凹部分别为行程点及退卡起点,该多个单向挡块是自该底板冲压凸出,使该循环路径自起始点→行程点→定位点→退卡起点→起始点形成单向循环。

具进退装置的产品构造

【技术领域】

[0001] 本实用新型是关于一种进退装置,特别是关于一种具进退装置的产品构造。

【背景技术】

[0002] 目前在电子产品的机构设计,应用上具有插入时隐藏定位及退出时外露功能的进退装置已广泛的应用在电子产品及电脑周边产品,诸如多媒体储存卡或是记忆卡等等,电脑所使用的记忆卡,目前市面上有多种规格如 Secure Digital Card(简称 SDC)、Multi Media Card(简称 MMC)、Smart Media Card(简称 SMC)、Memory Stick Card(简称 MSC)、XD-Picture Card(简称 XDC)等等,另外,目前的记忆卡亦有发展出一种 Express card。

[0003] 目前连接上述记忆卡的连接器为了使插入的记忆卡能插入隐藏定位及退出外露,其内是设有一进退卡装置,请参阅图 1 及图 2,是为一种现有的具有进退装置的记忆卡连接器,其设有一座体 10、多个端子 25、一滑片 20、一导引杆 26、及一弹簧 28,其中:

[0004] 该座体 10 是由一底座 11 及上盖 19 盖合而成,请配合参阅图 3,该底座 11 是为塑胶射出成型,其内设有一可放置数种不同规格记忆卡的容置槽 18,其一侧一体成型设有一滑槽 12,该滑槽 12 是呈心型,其一端为起点 13,而另一端为一行程点 14、一中间凹陷的定位点 15 及一退卡起点 16,该滑槽 12 上成型有数个斜块 17,使得由起点 13 → 行程点 14 → 定位点 15 → 退卡起点 16 → 起点 13 成一单向循环。

[0005] 该多个端子 25 是成数排设于该底座 11 上。

[0006] 该滑片 20 呈 U 形状,其两侧抵合于底座 11 上的容置槽 18 两侧,其一侧前端设有一连接孔 21。

[0007] 该导引杆 26 两端皆成纵向的勾部 27,其一端勾于滑片 20 的连接孔 21,另一端勾于该底座 11 的滑槽 12。

[0008] 该弹簧 28 位于滑片 20 与底座 11 后端之间,其提供滑片 20 向座体 10 内移动后再退回的弹力。

[0009] 借由以上构造,当滑片 20 受到插入的记忆卡推动时即带动该导引杆 26 于滑槽 12 滑动,由于该滑槽 12 为单向循环,当记忆卡插入时导引杆 26 则先由起点 13 推至行程点 14 后再借由弹簧的弹力拉回而至定位点 15 定位;当退卡时,亦推入记忆卡,导引杆 26 则由定位点 15 推至退卡起点 16 后再借由弹簧的弹力拉回而回到起点 13,如此即可达到进退卡的功能。

[0010] 现有的构造有以下缺点,即:

[0011] 1. 滑片 20 是为塑胶射出成型者,塑胶材质强度差且容易受到外力而不慎断裂。

[0012] 2. 滑片 20 并未设计与座体作卡合滑动,为了使滑片 20 能平稳组装于座体内,故需将滑片 20 设计成 U 形状方能平稳置放于底座 11 上再借由上盖抵压定位,然而将滑片设计成 U 形状时除了使用材料多且塑胶材质脆弱更加容易断裂。

[0013] 3. 该滑槽 12 是为塑胶射出成型者,塑胶材质强度差,该导引杆 26 一端于该滑槽 12 内往复的滑动,使用时间久了该滑槽 12 容易受到磨损。

【实用新型内容】

[0014] 本实用新型的主要目的在于提供一种具进退装置的产品构造, 其将进退装置的滑片和机心以金属片一体弯折形成, 达到耐用且制造简便的效果。

[0015] 为达上述目的, 本实用新型具进退装置的产品构造, 其包括: 一座体; 及一进退装置, 其包括有: 一机心, 其设有一滑槽, 该滑槽呈一循环路径, 该滑槽设有一凹陷的定位点, 而另一端设有一起始点, 且其底面设有多个单向挡块, 借以使由起始点→定位点→起始点形成单向循环; 一滑片, 其可相对于该座体作前后滑动, 其设有一抵推部; 一导引杆, 该导引杆一端卡入该机心的滑槽且可顺着该循环路径滑动; 及一弹性元件, 其是提供该滑片向座体内移动后再回复原位的弹力; 其中, 该进退装置的机心与滑片是由一金属片一体弯折成型而成一滑片机心, 该导引杆的另一端定位于该座体。

[0016] 所述的具进退装置的产品构造, 其特征在于: 该产品构造为一电连接器, 该座体内设有一连接槽及至少一排端子。

[0017] 所述的具进退装置的产品构造, 其特征在于: 该座体设有一塑胶底座及一上盖, 该上盖盖合于塑胶底座上。

[0018] 所述的具进退装置的产品构造, 其特征在于: 该塑胶底座一侧设有组装槽, 该进退装置组装于该组装槽, 该滑片机心设有一抵靠部, 该弹性元件一端定位于座体, 另一端抵于该抵靠部。

[0019] 所述的具进退装置的产品构造, 其特征在于: 该上盖为金属材质。

[0020] 所述的具进退装置的产品构造, 其特征在于: 该机心设有: 一底板、一内轨迹板、一外轨迹板及多个单向挡块, 该内轨迹板是由底板的板面冲压凸出, 其一端呈尖端, 而另一端呈近 M 形而形成该凹陷的定位点, 该外轨迹板是弯折位于该底板的内侧且两者呈平行, 该外轨迹板设有一开孔将该内轨迹板包围于内, 该内、外轨迹板之间形成该滑槽, 该外轨迹板的开孔一端对应内轨迹板的尖端形成该起始点, 开孔另一端呈近 M 形对应该内轨迹板的近 M 形一端, 使该端形成一中间凸部及二凹部, 该二凹部分别为行程点及退卡起点, 该多个单向挡块是自该底板冲压凸出, 使该循环路径自起始点→行程点→定位点→退卡起点→起始点形成单向循环。

[0021] 综上所述, 本实用新型具有以下优点:

[0022] 1. 该滑片机心是为金属片一体弯折而成, 坚固耐用, 不致因外力碰损或是导引杆的往复滑动造成磨损。

[0023] 2. 滑片和机心结合为一不仅可简化构造亦使整体更为平稳的于塑胶底座上滑动。

[0024] 本实用新型的上述及其他目的、优点和特色由以下较佳实施例的详细说明中并参考图式当可更加明白。

【附图说明】

[0025] 图 1 是现有电连接器的立体分解图。

[0026] 图 2 是现有电连接器的立体组合图 (去除上盖)。

[0027] 图 3 是现有电连接器的滑槽立体图。

[0028] 图 4 是本发明第一实施例的立体分解图。

- [0029] 图 5 是本发明第一实施例的立体组合图。
- [0030] 图 6 是本发明第一实施例的立体组合图（去除上盖）。
- [0031] 图 7 是本实用新型第一实施例的滑片机心的三视图。
- [0032] 图 8 是本实用新型第一实施例的使用状态立体图。
- [0033] 图 9 是本实用新型第一实施例的使用状态立体图。
- [0034] 图 10 是本实用新型第一实施例的使用状态立体图。
- [0035] 图 11 是本实用新型第二实施例的座体反面时的立体分解图。
- [0036] 图 12 是本实用新型第二实施例的进退装置的立体图。
- [0037] 图 13 是本实用新型第二实施例的座体反面时的立体组合图。
- [0038] 图 14 是本实用新型第二实施例的座体正面时的立体组合图。
- [0039] 座体 3 塑胶底座 30 金属上盖 40 连接槽 31
- [0040] 端子 32 滑动槽 35 凸柱 36
- [0041] 进退装置 5 滑片机心 50 机心 51 底板 52
- [0042] 内轨迹板 53 外轨迹板 54 单向挡块 55 尖端 56
- [0043] 定位点 57 开孔 58 滑槽 59 起始点 60
- [0044] 行程点 61 退卡起点 62 纵向板 63 滑片 65
- [0045] 纵向板片 66 水平板片 67 抵推部 68 卡勾 69
- [0046] 导引杆 70 一端 71 一端 72 弹簧 75
- [0047] 一端 76 一端 77

【具体实施方式】

[0048] 请参阅图 4、图 5、及图 6，是为本发明第一实施例，其是为一种三合一记忆卡连接器，其包括一座体 3 及一进退装置 5，其中：

[0049] 该座体 3 设有一塑胶底座 30 及一金属上盖 40，该金属上盖 40 盖合于塑胶底座 30 上且两者间形成一连接槽 31，该塑胶底座 30 上设有二排端子 32，该塑胶底座 31 一侧设有一滑动槽 35，该滑动槽 35 一端设有一凸柱 36。

[0050] 请配合参阅图 7，该进退装置 5 包括有一滑片机心 50、一导引杆 70、及一弹簧 75，其中：

[0051] 该滑片机心 50 是设于该塑胶底座 30 的滑动槽 35，其由一金属片一体弯折成型而成一机心 51 及一滑片 65，其中该机心 51 设有：一底板 52、一内轨迹板 53、一外轨迹板 54 及多个单向挡块 55，其中：该内轨迹板 53 是由底板 52 的板面冲压凸出，其一端呈尖端 56，另一端呈接近 M 形而形成一凹陷的定位点 57；该外轨迹板 54 是弯折位于该底板 52 的上方且两者呈平行，该外轨迹板 54 设有一开孔 58 将该内轨迹板 53 包围于内，该内、外轨迹板 53、54 之间形成一滑槽 59，该滑槽 59 呈一循环路径，该外轨迹板的开孔 58 一端对应内轨迹板 53 的尖端 56 形成一起始点 60，开孔 58 另一端呈近 M 形对应该内轨迹板 53 的近 M 形一端，使该端形成一中间凸部及二凹部，该二凹部分别为行程点 61 及退卡起点 62；该多个单向挡块 55 是自该底板 52 冲压凸出，使该滑槽 59 自起始点 60 → 行程点 61 → 定位点 57 → 退卡起点 62 → 起始点 60 形成单向循环路径，另外，该底板 52 后端连接一纵向板 63；该滑片 65 设有一纵向板片 66、一水平板片 67 及一抵推部 68，该水平板片 67 设于该纵向板片 66 上端，

该抵推部 68 是自该纵向板片 66 一端弯折,该抵推部 68 可供插入的记忆卡抵推。

[0052] 该导引杆 70 呈 U 形状,其一端 71 卡勾定位于该塑胶底座 30,其另一端 72 套入该机心 51 的滑槽 59,当该滑片机心 50 受推动时即带动该导引杆 70 的一端 72 于该滑槽 59 滑动。

[0053] 该弹簧 75 是设于该塑胶底座 30 的滑动槽 35,其一端套入该凸柱 36,另一端固抵于该滑片机心 50 的纵向板 63。

[0054] 借由以上构造,请参阅图 6 及图 7,当记忆卡尚未插入连接槽 31 时,该滑片机心 50 未被推动,此时该导引杆一端 72 位于该滑片机心 50 的滑槽 59 的起始点 60,当记忆卡插入连接槽时会抵到该滑片机心 50 的抵推部 68 推动该滑片机心 50 向后滑动,请参阅图 8,当将记忆卡插入到底时,该导引杆一端 72 位于该滑槽 59 的行程点 61,请参阅图 9,当放手时该滑片机心 50 因该弹簧 75 的回弹而退回,此时导引杆一端 72 即顺着滑槽 59 的单向循环路径而位于该定位点 57,此时该滑片机心 50 成定位状态,记忆卡即位于插入状态;请参阅图 10,当要退卡则再将记忆卡往后压入,此时导引杆一端 72 即顺着滑槽 59 的单向循环路径而位于退卡起点 62,当再放手时该滑片机心 50 因该弹簧 75 的回弹而退回,此时导引杆一端 71 即顺着滑槽 59 的单向循环路径而位于该起始点 60,如图 6 及图 7 所示,此时该滑片机心 50 回到起始位置,记忆卡即位于退出状态。

[0055] 由以上说明,本实用新型可归纳以下优点:

[0056] 1. 该滑片机心 50 是为金属片一体弯折而成,坚固耐用,不致因外力碰损或是导引杆 70 的往复滑动造成磨损。

[0057] 2. 滑片 65 和机心 50 结合为一不仅可简化构造亦使整体更为平稳的于塑胶底座上滑动。

[0058] 请参阅图 11、图 12、图 13 及图 14,是为本实用新型第二实施例,是为一种 Express card 连接器,其大致与第一实施例相同,本实施例同样包括一座体 3 及一进退装置 5,其中:

[0059] 该座体 3 设有一塑胶底座 30 及一金属上盖 40,该塑胶底座 30 上设有一连接槽 31 及一排端子 32,该金属上盖 40 盖合于塑胶底座 30 上,该金属上盖 40 的一侧边设有一卡勾 41 及一卡孔 42。

[0060] 该进退装置 5 大致与第一实施例相同,同样包括有一滑片机心 50、一导引杆 70、及一弹簧 75,其中:

[0061] 该滑片机心 50 是设于该金属上盖 40 的一侧边,其由一金属片一体弯折成型而成一机心 51 及一滑片 65,该机心 51 的构造与第一实施例大致相同,差别在于本实施例成起立,其滑槽 59 朝外侧,该滑片 65 设有一抵推部 68 及卡勾 69,该抵推部 68 可供插入的记忆卡抵推。

[0062] 该导引杆 70 的一端 71 卡勾定位于该金属上盖 40 一侧的卡孔,另一端 72 套入该机心 51 的滑槽 59,当该滑片机心 50 受推动时即带动该导引杆 70 的一端 72 于该滑槽 59 滑动。

[0063] 该弹簧 75 的一端 76 卡勾于该滑片机心 50 的卡勾 69,另一端 77 卡勾于该金属上盖 40 一侧的卡勾 41。

[0064] 上述实施例是以 Express card 连接器及共用记忆卡连接器作说明,然而有关其他

具有进退装置的产品,若同样应用到本实用新型的特征-金属片一体弯折成型的滑片机心则仍属本实用新型的应用范围。

[0065] 在较佳实施例的详细说明中所提出的具体的实施例仅为了易于说明本实用新型的技术内容,而并非将本实用新型狭义地限制于该实施例,在不超出本实用新型的精神及申请专利范围的情况,可作种种变化实施。

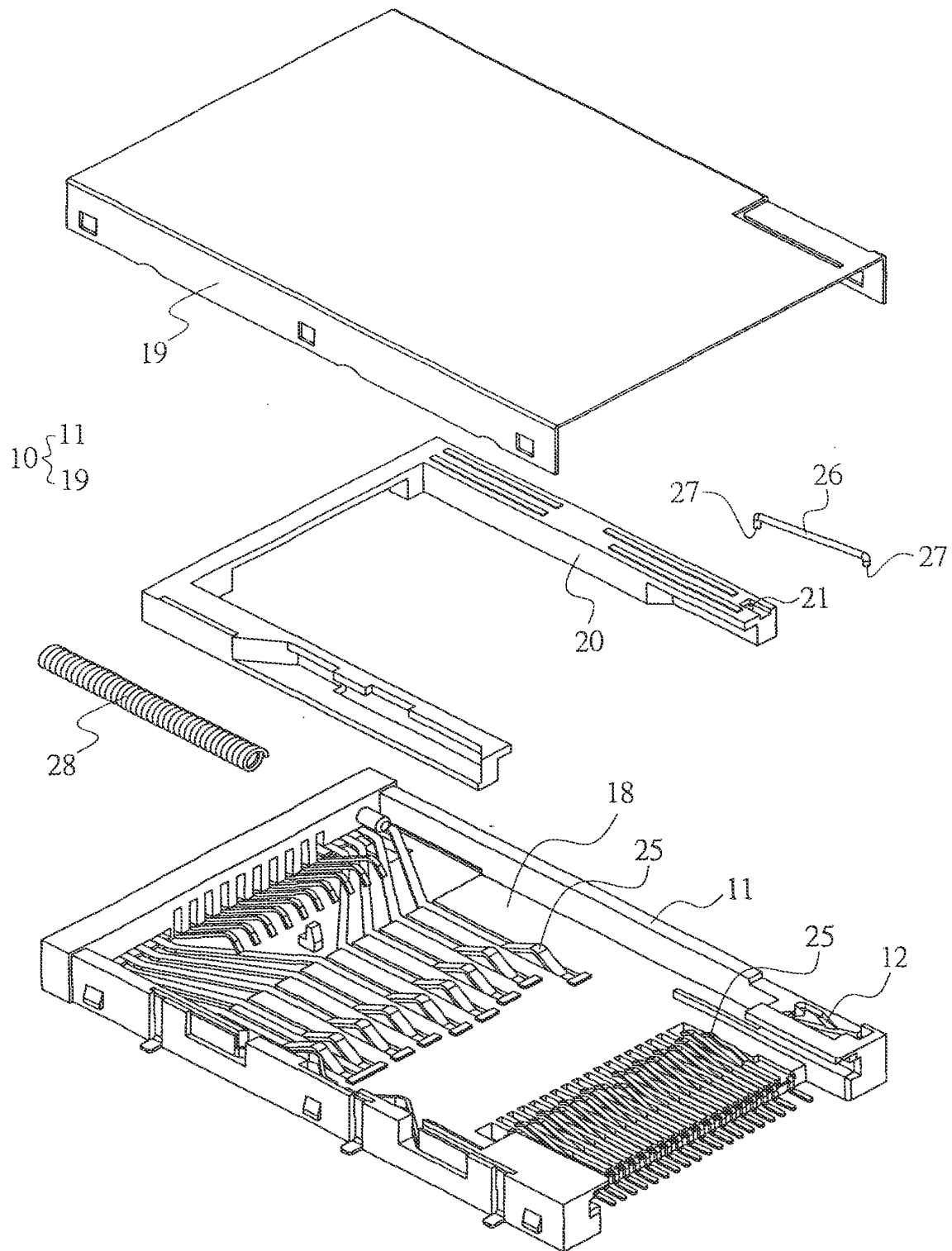


图 1

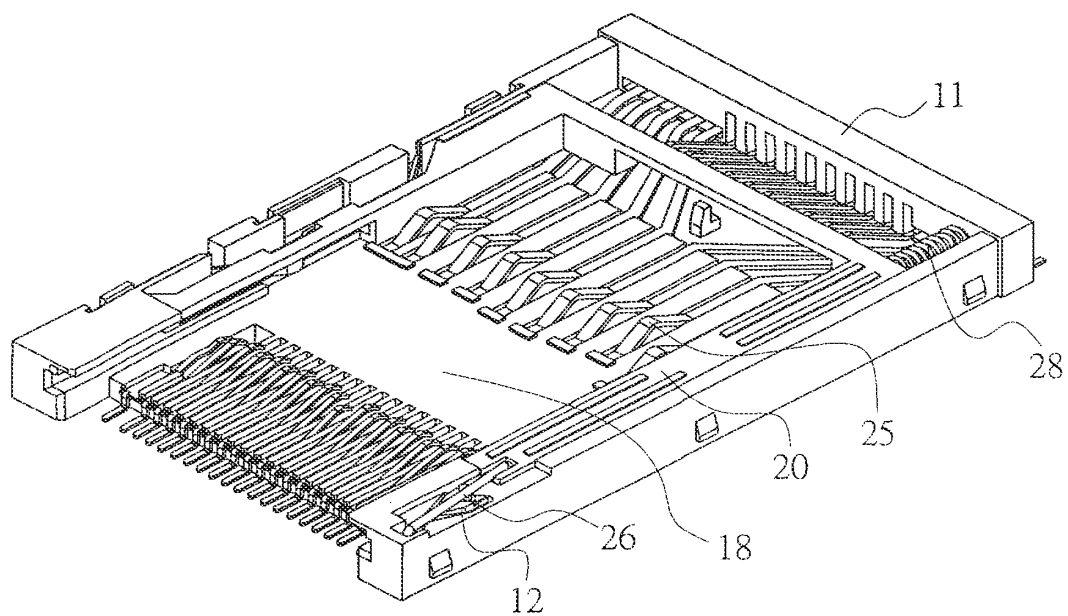


图 2

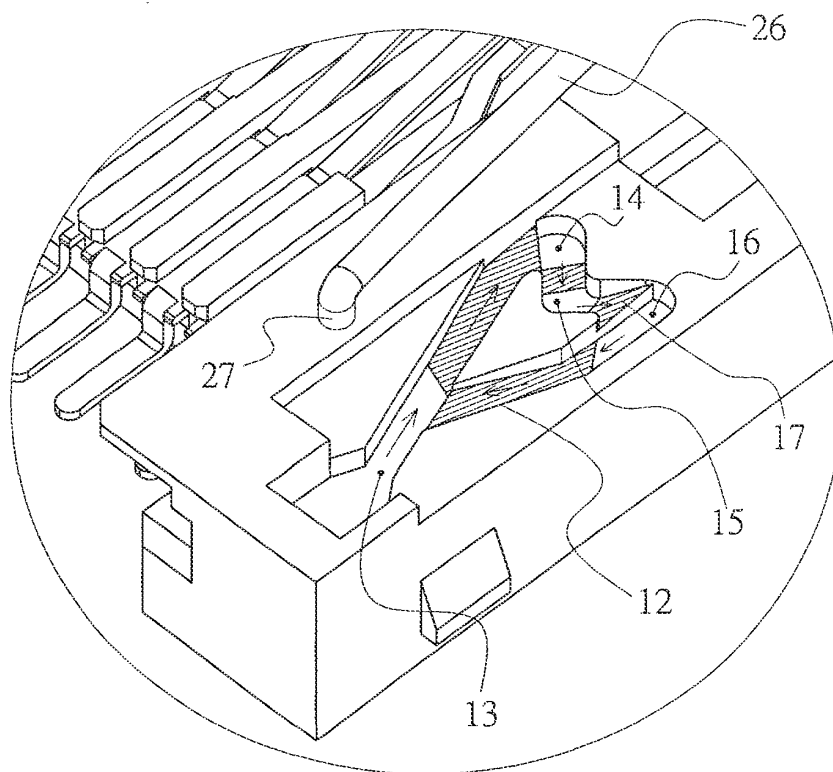


图 3

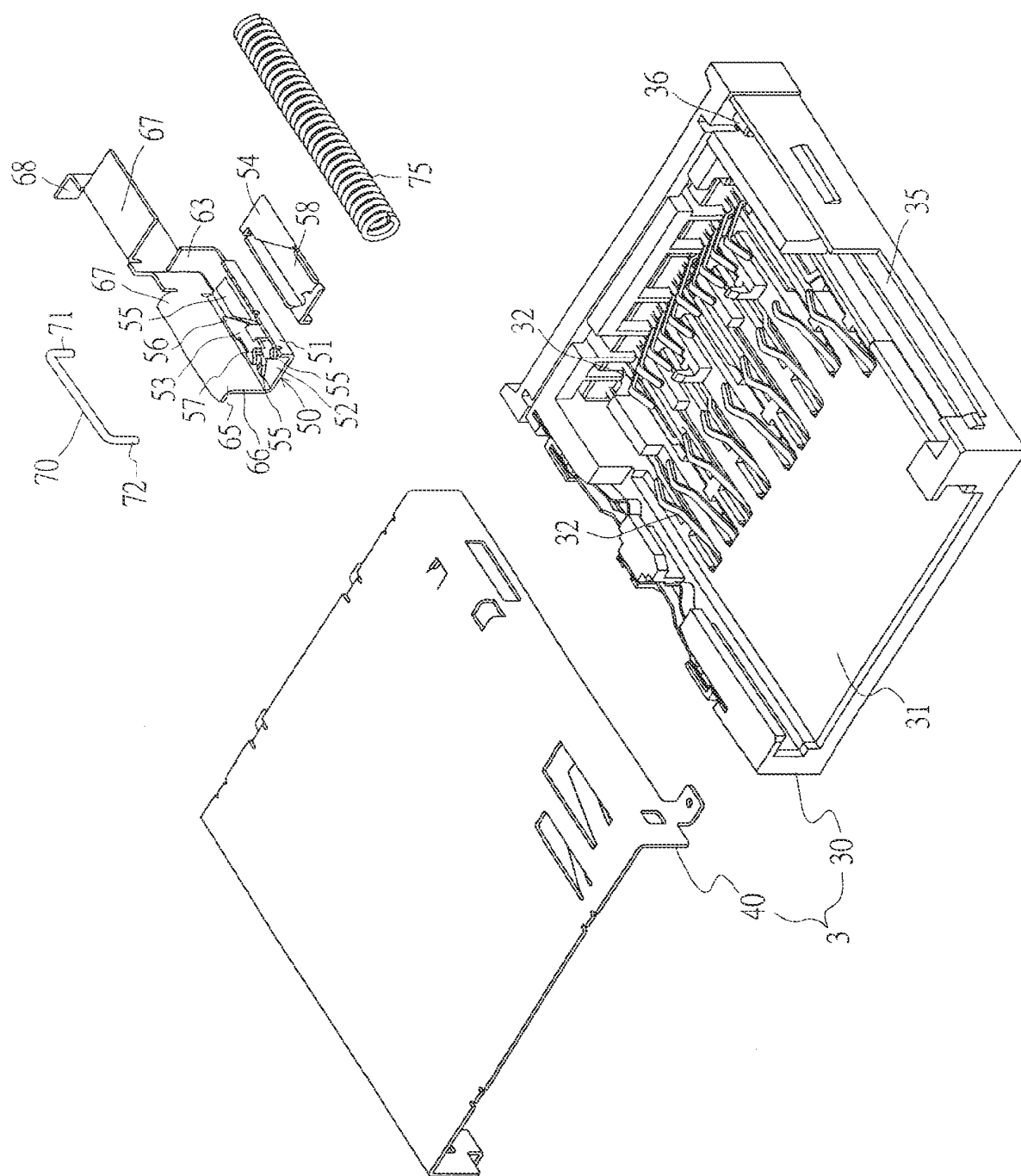


图 4

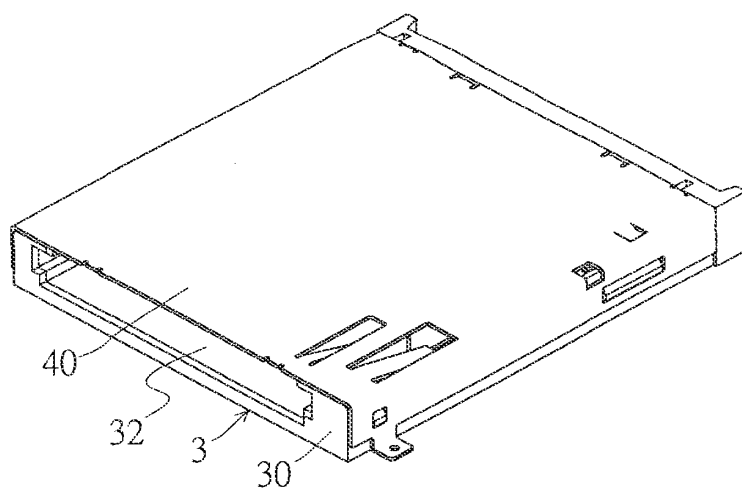


图 5

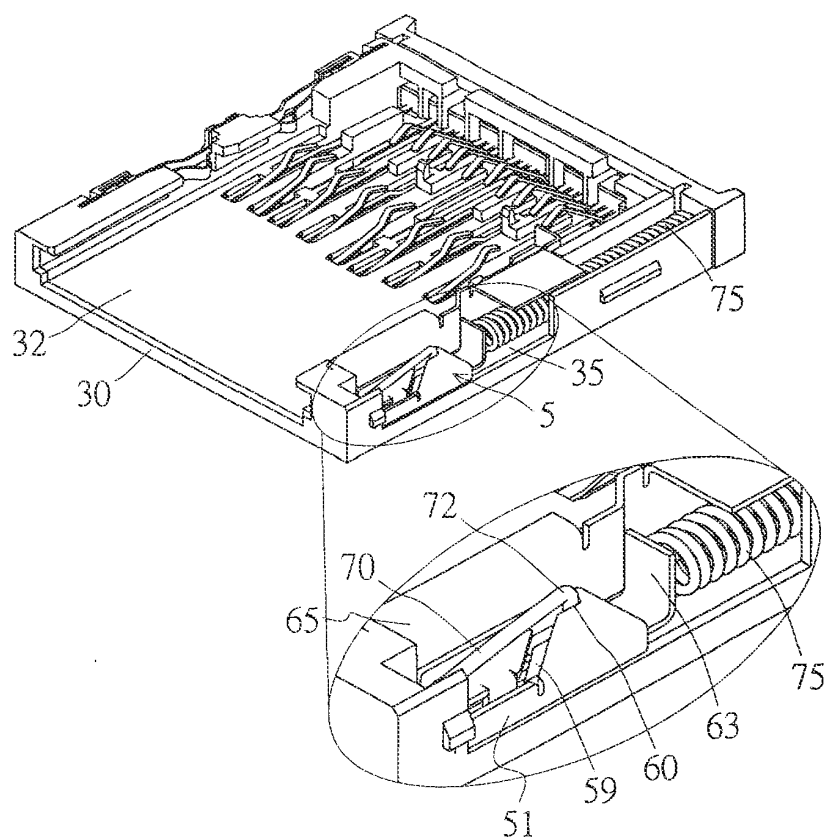


图 6

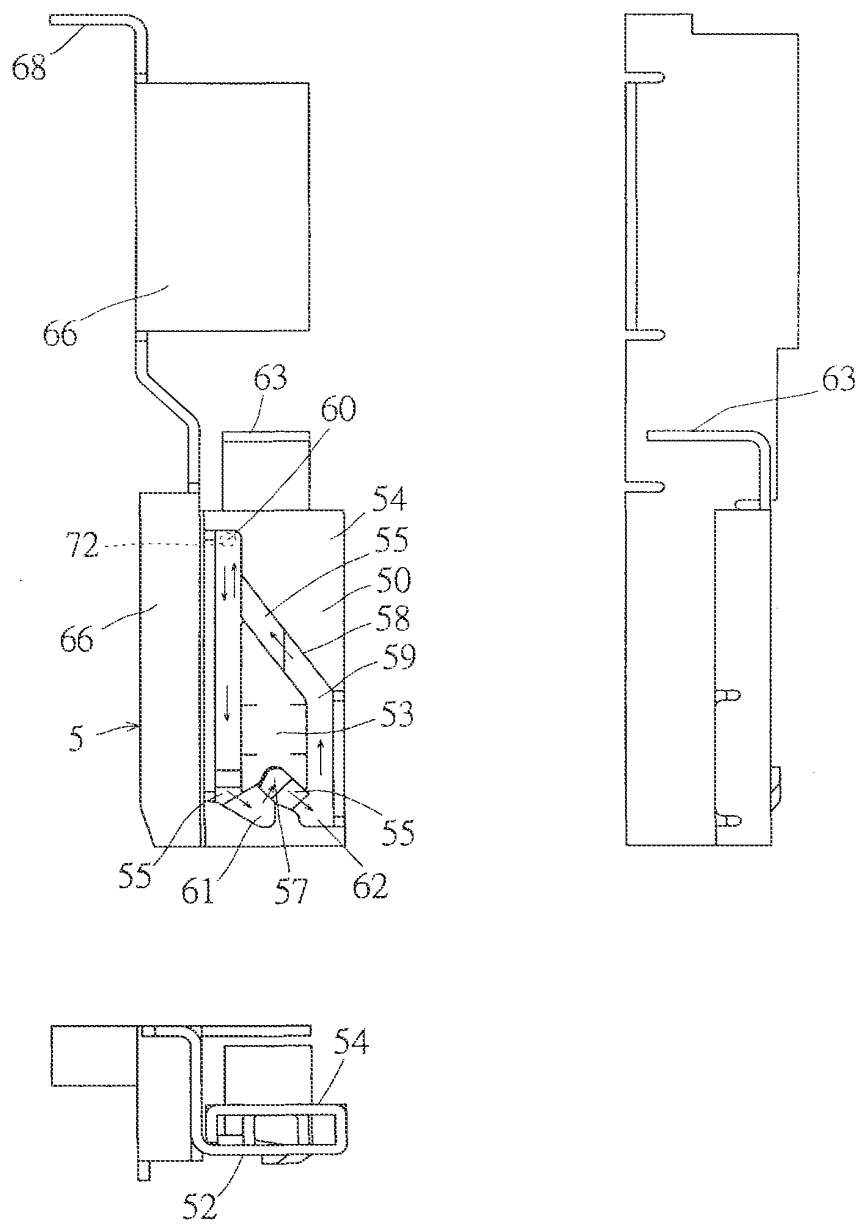


图 7

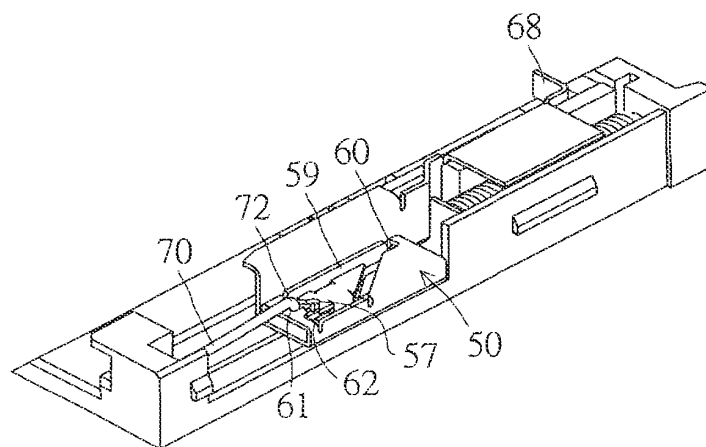


图 8

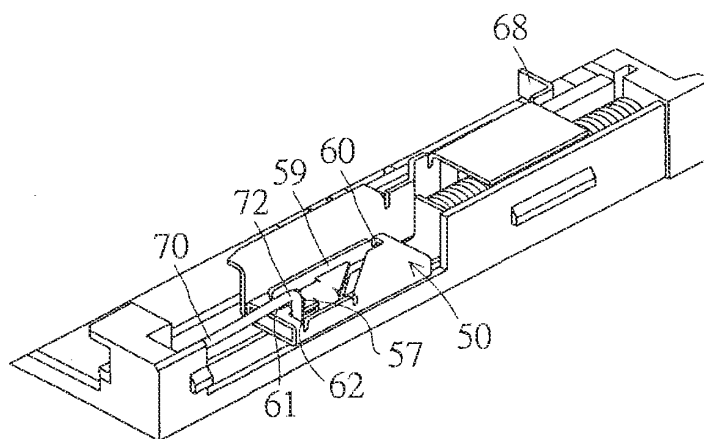


图 9

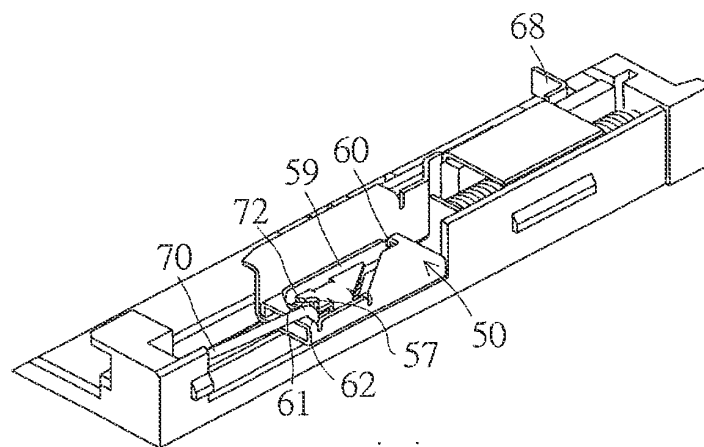
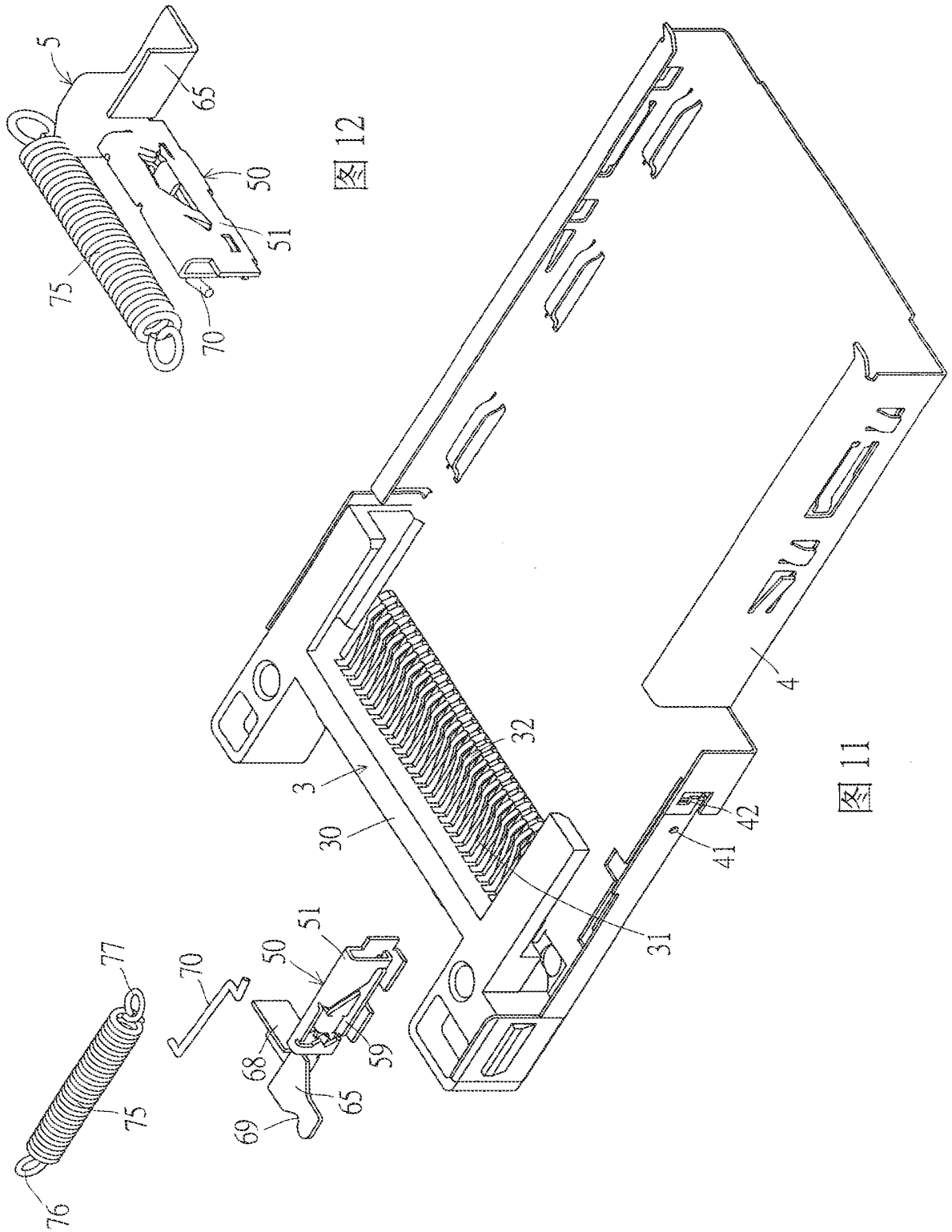


图 10



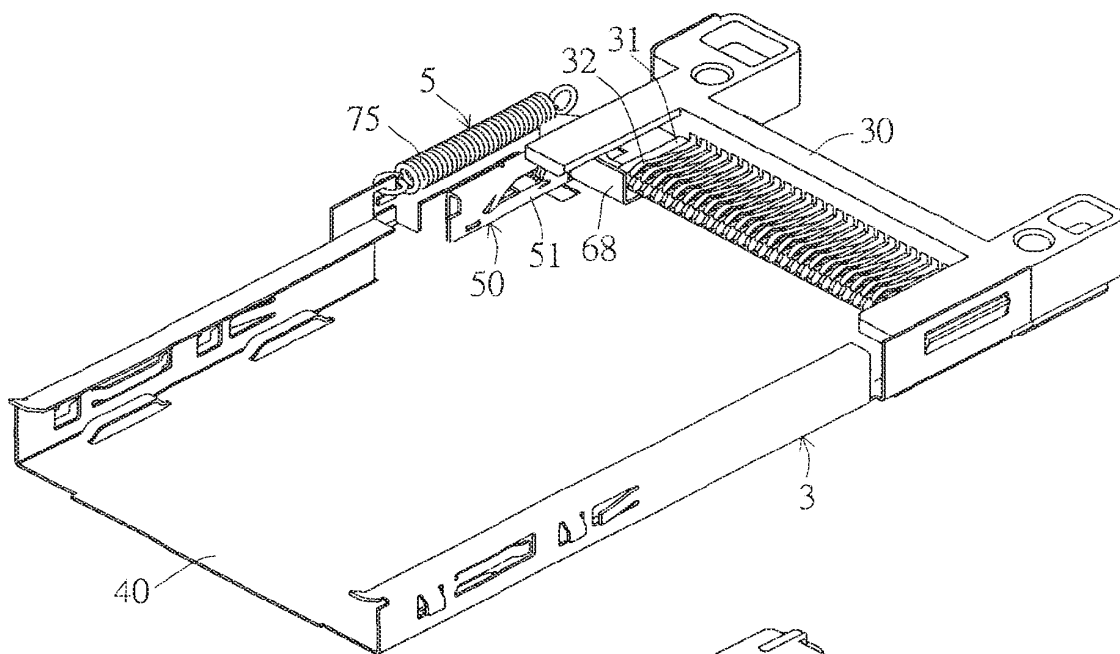


图 13

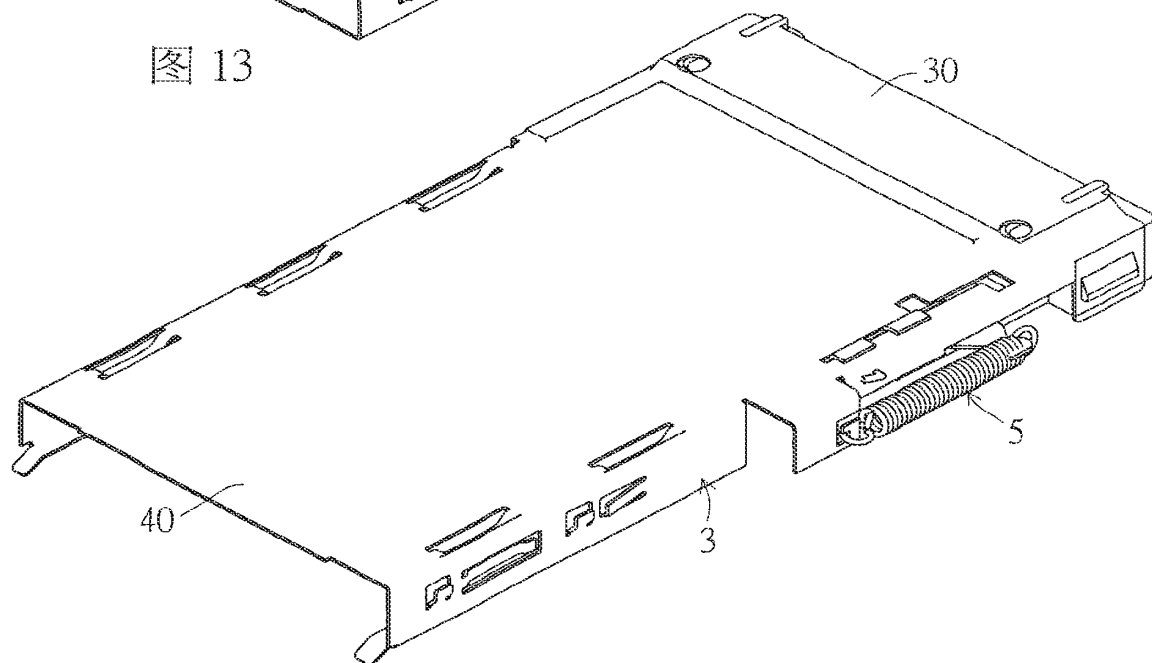
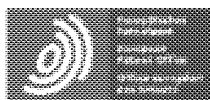


图 14



Espacenet

Bibliographic data: CN1734857 (A) — 2006-02-15**Double-side plug-in USB adapter****Inventor(s):** YAO LIHE [CN] ± (LIHE YAO)**Applicant(s):** YAO LIHE [CN] ± (YAO LIHE)**Classification:** - **international:** *H01R13/502; H01R24/66; H05K1/00; H05K1/11*- **cooperative:****Application number:** CN20041057437 20040813**Priority number(s):** CN20041057437 20040813**Abstract of CN1734857 (A)**

This invention relates to USB joint fit to double surface inserting, wherein, forming conduction junctions on two surfaces of circuit board according to USB standard and frame plates with a plurality of vertical ribs; wherein, there is hollow slit between two near ribs, the junction's place matches the split; inserting USB joint in corresponding connection port with any surface that the junction and conduction terminal form electric connection; the ribs on another surface prop to metal spring in terminal to ensure to prevent the contact from short circuit.

[19] 中华人民共和国国家知识产权局



[12] 发明专利申请公开说明书

[21] 申请号 200410057437.5

[51] Int. Cl.

H01R 24/06 (2006.01)

H01R 13/502 (2006.01)

H05K 1/00 (2006.01)

H05K 1/11 (2006.01)

[43] 公开日 2006 年 2 月 15 日

[11] 公开号 CN 1734857A

[22] 申请日 2004.8.13

[21] 申请号 200410057437.5

[71] 申请人 姚立和

地址 台湾省台北市

[72] 发明人 姚立和

[74] 专利代理机构 中原信达知识产权代理有限责任
公司

代理人 陈肖梅 文 琦

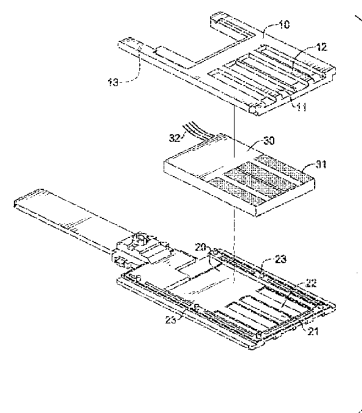
权利要求书 2 页 说明书 6 页 附图 5 页

[54] 发明名称

可双面插接的 USB 接头

[57] 摘要

本发明涉及一种可双面插接的 USB 接头，于一电路板的双面分别形成符合 USB 规格的导电接点，同时于该电路板的两面分设一框板，各框板形成有数道纵长肋条，两相邻肋条间形成一镂空狭缝，前述导电接点的位置恰对应于该些镂空狭缝处，令该 USB 接头可利用任一面插设于对应的连接端口内，该面的导电接点可对应与连接端口内的导电端子构成电气接触，而该接头另面框板上的肋条抵止于连接端口内的金属弹片上，确保接头另面的导电接点不致接触于金属弹片而造成短路。



1. 一种可双面插接的 USB 接头，其特征在于，包含：

5 一上框板，其上形成有数道肋条，两相邻肋条间形成一镂空的纵长狭缝；

一下框板，形成有对应该上框板的数道肋条，于两相邻肋条间亦形成一镂空的纵长狭缝；

10 一以多层线路构成的电路板，夹合于前述上、下两框板之间，该电路板一端的正、反两面均形成 USB 导电接点，该些导电接点的位置对应于上、下两框板的镂空狭缝处。

2. 如权利要求 1 所述可双面插接的 USB 接头，其中，该上框板两相对侧边的内面上设有数个定位孔，且该下框板两相对侧边的内面上设有数个定位凸点，藉其与上框板的定位孔形成对应结合。

15

3. 如权利要求 1 或 2 所述可双面插接的 USB 接头，其中，该电路板具有四层线路设计，位于最外侧的第一、四层线路形成前述的 USB 导电接点，置中的第二、三两层则分别作为接地片与电源片。

20 4. 如权利要求 3 所述可双面插接的 USB 接头，其中，该 USB 导电接点包含一电源接点 V、两资料接点 D1、D2 及一接地接点 G；其中，第一、四两层重叠后，其上的资料接点 D1、D2 呈交叉布线。

25 5. 如权利要求 4 所述可双面插接的 USB 接头，其中，该第一层线路上的电源接点经由第二层线路而连接至第三层线路，又该第一层线路上的接地接点直接连接于第二层线路。

30 6. 如权利要求 5 所述可双面插接的 USB 接头，其中，该第四层线路上的接地接点经由第三层线路而连接至第二层线路，又该第四层线路上的电源接点直接连接于第三层线路。

7. 如权利要求 3 所述可双面插接的 USB 接头, 其中, 该上、下框板的周缘复利用超音波技术加以固合。

5 8. 如权利要求 3 所述可双面插接的 USB 接头, 其中, 该接头的厚度介于 1.7mm~2.3mm 之间。

可双面插接的 USB 接头

5 技术领域

本发明涉及一种可双面插接的 USB 接头，尤指一种正反两面均可与 USB 标准连接端口构成信号接触而无方向限制的 USB 双面接头。

背景技术

10 个人计算机的外部接口设备种类近年来是渐趋丰富，键盘、鼠标、打印机、扫描仪早为人所知，CCD 摄影机、数码相机、MP3 随身听、外接硬盘等接踵而来，若是单凭现有的并列端口和串接端口已经无法满足用户的需要，USB 接口的推出无疑可解决该项问题。

15 USB 的优点如下：首先它可以支持热插拔技术与随插即用功能，这样用户可以方便地在计算机上直加增添外围设备，而且 USB 接口并不使用 IRQ 的中断控制以及输入输出的地址资源，最多可以连结 127 个设备。另外，USB 接口的另一优点即传输速度快，随着新一代的 USB 2.0 规范诞生，资料的传输频宽更具有显著扩展。

20 USB 2.0（通用串行总线）是由诸多厂商联合制订，包括康柏、惠普、英特尔、Lucent、微软、NEC 和 Philips。USB2.0 在现有的 USB1.1 规格上增加了高速数据传输模式。在 USB2.0 中，除了 USB1.1 中规定的 1.5Mbit/s 和 12Mbit/s 两个模式以外，还增加了 480Mbit/s（60MB/s）
25 这一“高速”模式，由于增加了高速模式，将会使 USB 的应用范围更进一步扩大，再者，USB2.0 亦具有向下兼容的特性，可以使用原来 USB1.1 定义中同样规格的电缆，接头的规格也完全相同，在高速的前提下一样保持了 USB 1.1 的优异特色，且不会和 USB 1.X 设备在共同使用的时候发生任何冲突。

就目前市面上各式外围设备的 USB 公接头来看，仅能以单一面插设于 USB 母连接端口内，若是将该 USB 公接头翻转后，受限于 USB 连接端口内一挡块加以抵止，该公接头便无法连接于母连接端口内，该挡块的设置目的是为了确
5 保公接头上的四个导电端点能正确地与连接端口内的四个端点构成对应接触，以避免电源端与接地端误接。

针对某些 USB 装置来说，若是仅能以单一方向插接于连接端口内，于实际操作应用时将极不方便。举例而言，如图 6 所示，对于直接
10 在卡体上形成有 USB 接头的记忆卡而言，若采单一方向插设在计算机面板上的连接端口，卡体侧缘可能受面板部份的挡止而无法令 USB 接头顺利插入，此时若可将记忆卡翻转后，令 USB 接头改采另一面插入连接端口，便能解决此一问题，由此可知具双面插接功能的 USB 接头确实可提高装置操作的便利性。

15 发明内容

本发明的目的在于克服现有技术的不足与缺陷，提供一种可双面插接的 USB 接头，该 USB 接头的正反两面均可与 USB 标准连接端口构成信号接触。

20 为完成前述目的，该可双面插接的 USB 接头包含：

一上框板，其上形成有数道肋条，两相邻肋条间形成一镂空的纵长狭缝；

一下框板，形成有对应该上框板的数道肋条，于两相邻肋条间亦形成一镂空的纵长狭缝；

25 一以多层线路构成的电路板，夹合于前述上、下两框板之间，该电路板一端的正、反两面均形成 USB 规格的导电接点，该些导电接点的位置对应于上、下两框板的镂空狭缝处。

30 上述结构的 USB 接头能以其任一面插设于对应连接端口内，接头上其中一面的导电接点可与连接端口的导电端子构成电气接触，又

该接头另面的肋条恰可抵止于连接端口内的金属弹片上，确保接头另面的导电接点不接触于该金属弹片而造成短路。以上述的 USB 接头无论以正方向或反方向插入连接端口，均可构成信号连结，而无方向性限制。

5

附图说明

- 图 1 为本发明的分解图；
- 图 2 为本发明双面 USB 接头电路板的各层电路布线图；
- 图 3 为本发明的一立体外观图；
- 10图 4 为本发明经翻转后的立体外观图；
- 图 5 为本发明的操作示意图；
- 图 6 为一现有具有 USB 接头的记忆卡的操作示意图。

图中符号说明

15	10	上框板	11	狭缝
	12	肋条	13	定位孔
	20	下框板	21	狭缝
	22	肋条	23	定位凸点
	30	电路板	31	导电接点
20	32	导线	41	第一层线路
	42	第二层线路	43	第三层线路
	44	第四层线路	50	USB 连接端口
	51	导电端子	52	弹片

25具体实施方式

请参阅图 1 所示，本发明可双面插接的 USB 接头包含以绝缘材质构成的一上框板 10、一下框板 20 与一夹合在该上、下框板 10、20 之间的电路板 30。

30于上框板 10 形成有数道肋条 12，两相邻肋条 12 间形成一道镂

空的纵长狭缝 11；在上框板 10 两相对侧边的内面上设有数个定位孔 13。

5 而前述下框板 20 的构造对应上框板 10，亦具备数道肋条 22 及四道镂空的纵长狭缝 21；在下框板 20 两相对侧边的内面上平均设有数个定位凸点 23，藉其与上框板 10 的定位孔 13 形成对应固定，两框板的周缘可进一步利用超音波技术加以固合。

10 该电路板 30 即夹合在上、下框板 10、20 之间，该电路板 30 其中一端部的正、反两面均形成有 USB 导电接点 31，而其另一端部即连接有数条导线 32，以构成一双面 USB 接头；当电路板 30 置于上、下框板 10、20 之间时，两面导电端点 31 的位置恰对应于上、下框板 10、20 的狭缝 11、21 处。

15 请参阅图 2 所示，前述构成 USB 接头的电路板 30 为多层的电路布线设计，如图中所示共计有四层线路 41~44，位于最外侧的第一、四层线路 41、44 供形成前述的 USB 导电接点 31，置中的第二、三两层 42、43 则分别作为接地片(GND)与电源片(VCC)。在此必须陈明的一点是图面上第一、四层 41、44 的电路布线为正片处理（即空白区域不具导电材质），且第一层线路 41 所标示的双圆形点代表绝缘贯孔。反之，第二、三层 42、43 均为负片处理（即空白区域具有导电材质），其上空心圆点标示处表示与导电材质电连接的导孔，而实心圆点表示绝缘贯孔，故第二层线路 42 大部份面积均为接地，第三层线路 43 大多数面积即为电源。

25

各层线路之间的连接如下：首先请参照第一、四两层的线路 41、44，四个 USB 导电接点依其电气特性分别标注为 V（电源）、D1（第一资料接脚）、D2（第二资料接脚）及 G（接地）。在第一层线路 41 的两 USB 导电接点 D1、D2 分别连接有一导电孔 a1、a2，而第四层线路 44 的两导电接点 D1、D2 分别连接有导电孔 a1'、a2'。前述两导

30

电孔 a1、a2 经由第二、三层线路 42、43 对应连接至第四层线路 44 的导电孔 a1'、a2'，若两层线路 41、44 重叠视的，导电孔 a1、a2 与 a1'、a2' 将相互交叉，故前述两 USB 导电接点 D1、D2 形成正确的对应连接。

5

第一层线路 41 的接地连接利用导电接点 G 的两接触区域 b1、b2 对应连接至第二层线路 42 的导电孔 b1'、b2'，而其电源连接以导电接点 V 的接触区域 c1 对应连接至第三层线路 43 的导电孔 c1'。

10

第四层线路 41 的接地连接利用导电接点 G 的两接触区域 b3、b3 对应连接至第二层线路 42 的导电孔 b3'、b4'，而其电源连接以导电接点 V 的接触区域 c2、c3 对应连接至第三层线路 43 的导电孔 c2'、c3'。

15

通过前述四层线路的相互连接，形成正、反两面均具有 USB 导电接点的接头，如图 3、4 所示，为本发明的正、反两面的立体外观图。以图 3 的正面视之，该 USB 接头上的导电接点 31 的排列依序为 V（电源）、D1（第一资料接脚）、D2（第二资料接脚）及 G（接地），纵使经翻转后如图 4 所示，该 USB 接头上的导电接点 31 的排列顺序仍是相同。

20

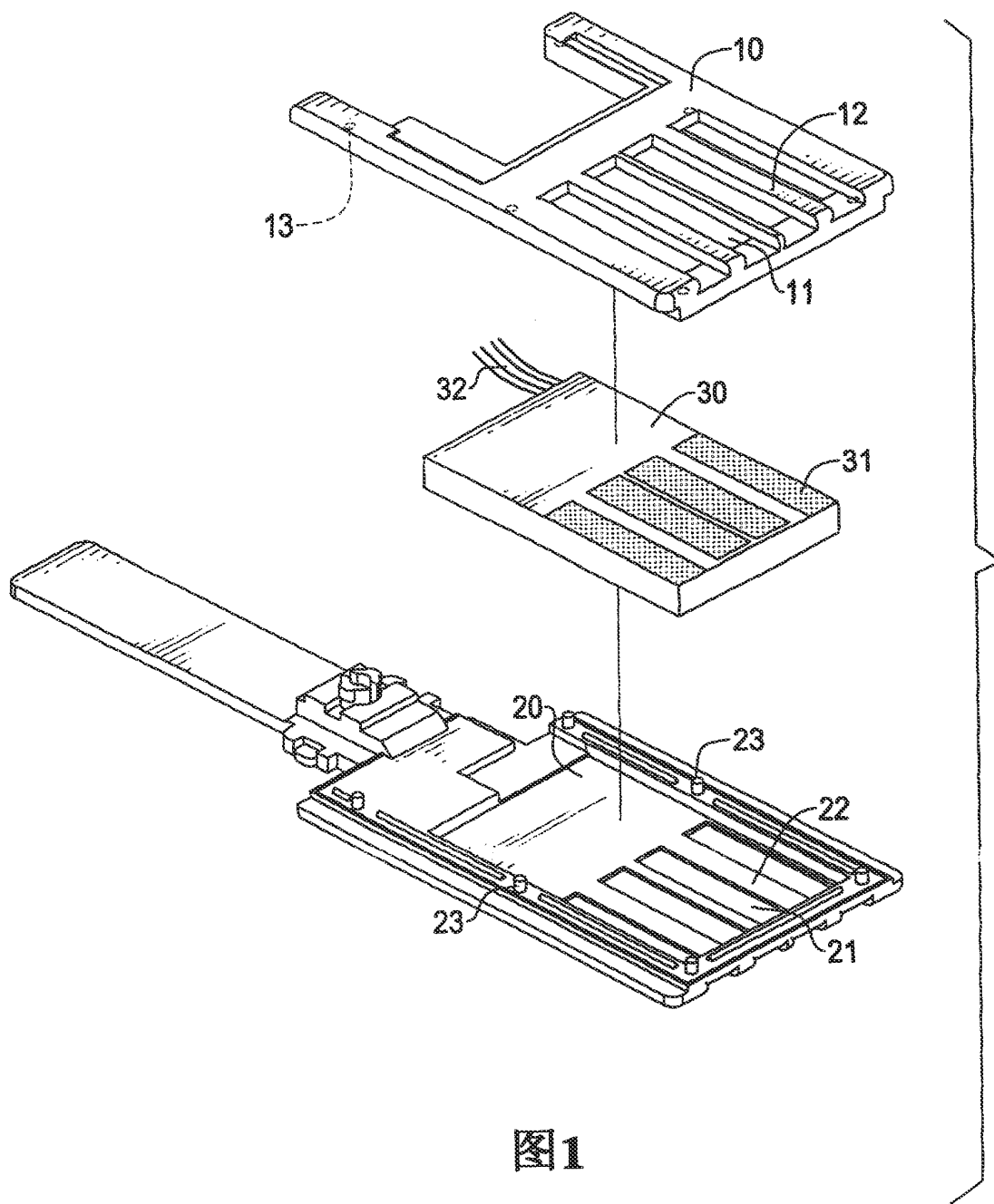
请参阅图 5 所示，为本发明的操作示意图。该双面插接的 USB 接头插设于一 USB 连接端口 50 后，USB 连接端口 50 内的四个金属导电端子 51 对应与接头其中一面的四个导电接点 31 构成对应接触；至于接头另面则因为突出的肋条 12 抵触在该 USB 连接端口 50 底面的金属弹片 52 上，故此面的四个导电接点 31 并不会直接与弹片 52 接触而造成短路。

25

综上所述，本发明可双面插接的 USB 接头可广泛应用于各式的电子产品上，如此一来，该电子产品在实际操作时便能选择适当的方向将接头对应连结至连接端口内，再者，本发明所提出的接头设计，

30

其厚度相较于现有 USB 接头的厚度大幅缩减将近一半(约为 1.7~2.3mm), 极适合整合在厚度要求轻薄的电子产品(如记忆卡), 相较于现有的 USB 接头设计, 本发明显然具备明显功效提升。



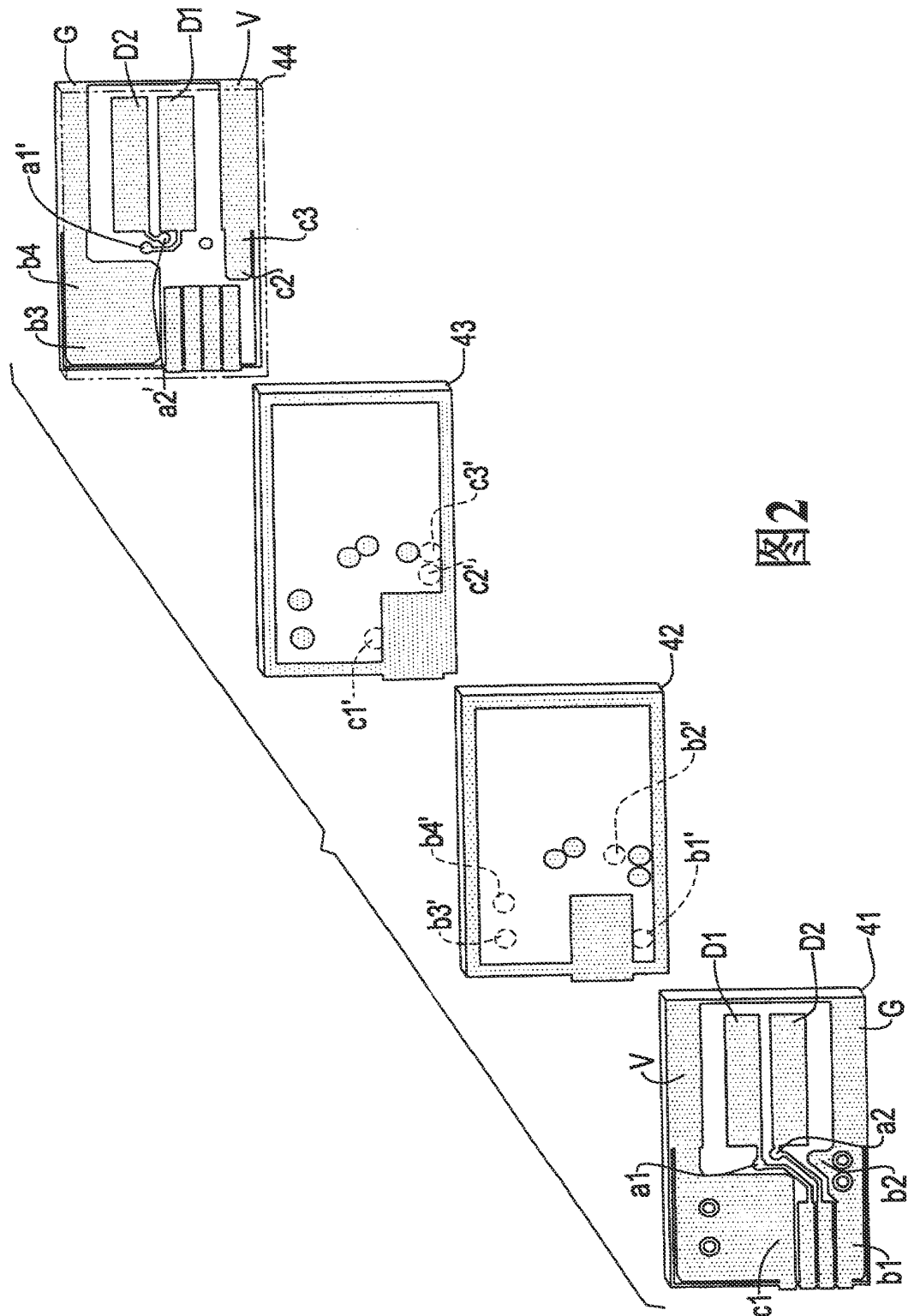


图2

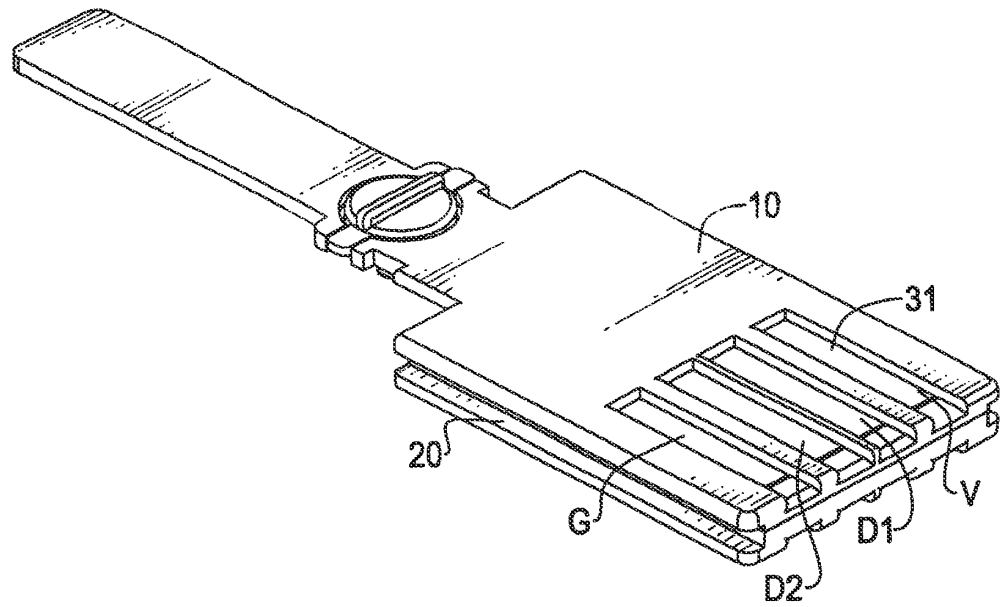


图3

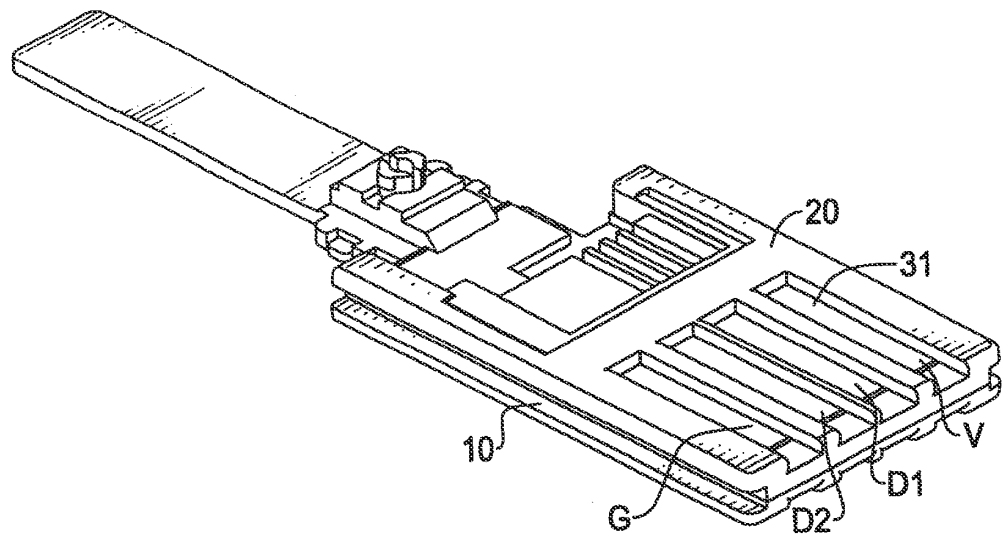
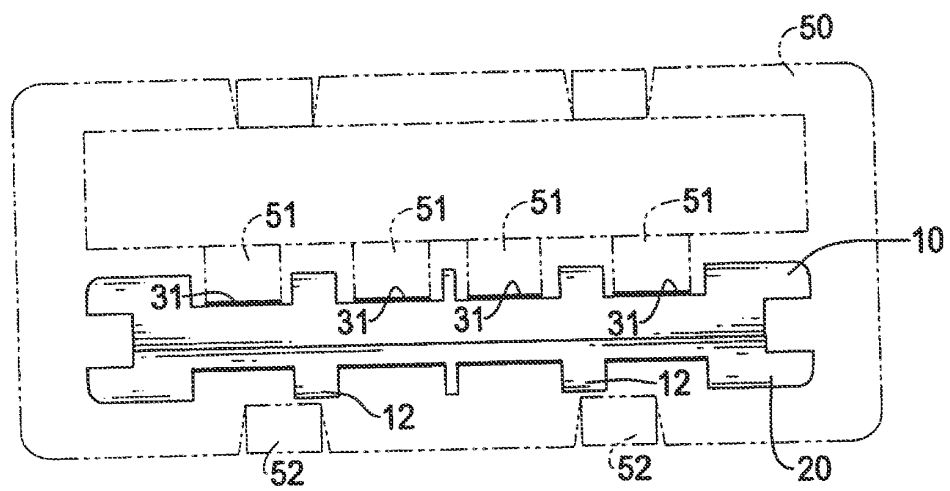
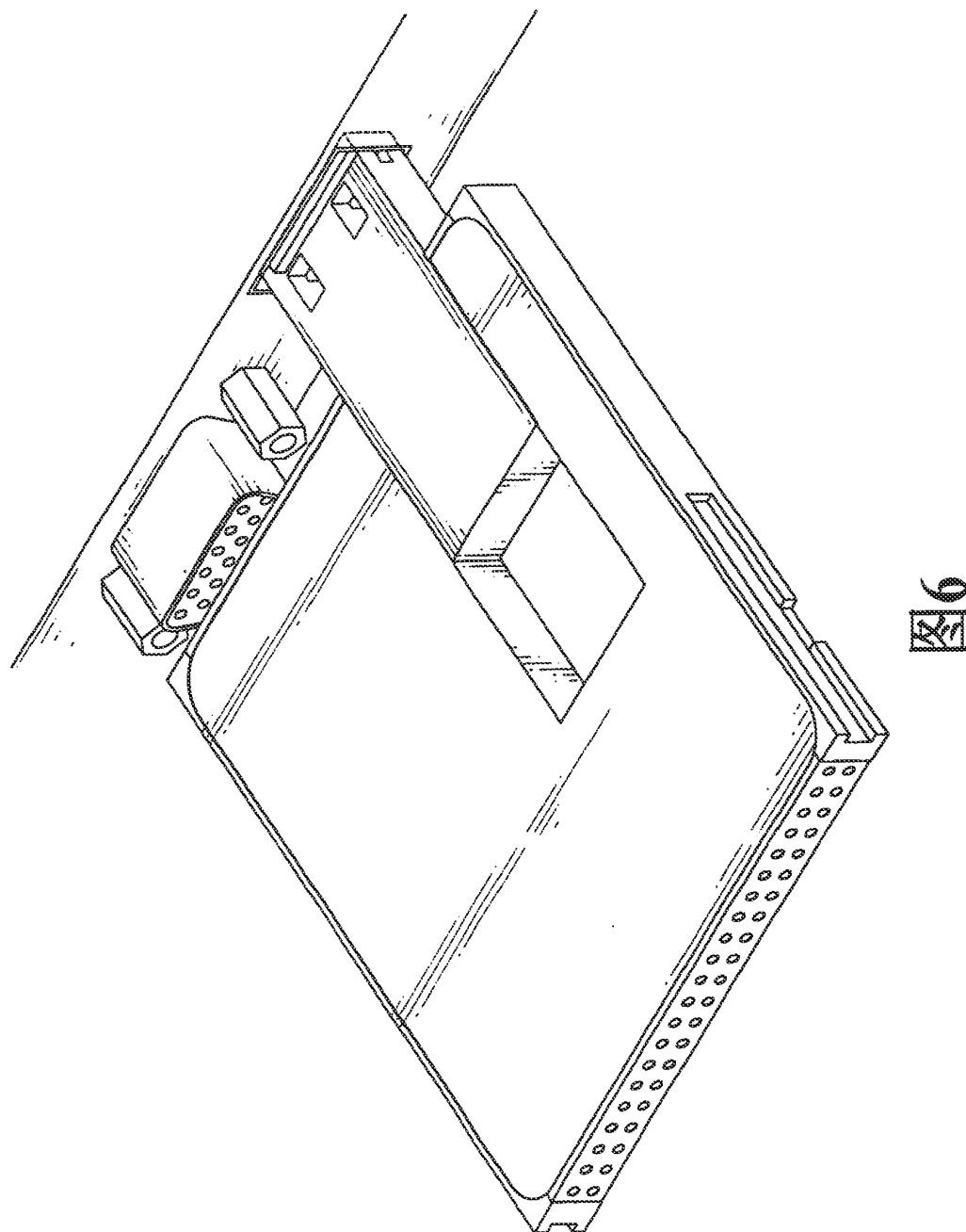
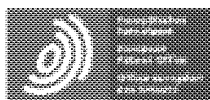


图4

**图5**





Espacenet

Bibliographic data: CN201490374 (U) — 2010-05-26**Structure of electric connecting socket**

Inventor(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)
Applicant(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)
Classification: - **international:** *H01R13/26; H01R13/46*
- **cooperative:**
Application number: CN200920149920U 20090422
Priority number(s): CN200920149920U 20090422

Abstract of CN201490374 (U)

The utility model provides a structure of an electric connecting socket, which comprises a plastic base body, a connecting groove, a tongue piece and at least one row of terminals, wherein the connecting groove is positioned at the front end of the plastic base body; the tongue piece is positioned at the front end of the plastic base body and in the connecting groove; and the terminals are arranged at one surface of the tongue piece at intervals, each terminal is provided with a contacting part, an extension part, a fixing part and a foot connecting part, the extension part is extended to the front end of the tongue piece, the contacting part protrudes out of one surface of the tongue piece, and the foot connecting part is extended out of the plastic base body. The structure is characterized in that the plate surfaces of the extension parts of the terminals flatly cling to one surface of the tongue piece, and one end of the contacting part is connected with the extension part and gradually protrudes out of a plate surface of the extension part from the front to the back to be extended to the other end to be opened.



(12) 实用新型专利

(10) 授权公告号 CN 201490374 U

(45) 授权公告日 2010.05.26

(21) 申请号 200920149920.4

(22) 申请日 2009.04.22

(73) 专利权人 蔡周贤

地址 中国台湾台北县

(72) 发明人 蔡周贤

(74) 专利代理机构 永新专利商标代理有限公司
72002

代理人 张文达

(51) Int. Cl.

H01R 12/14 (2006.01)

H01R 13/26 (2006.01)

H01R 13/46 (2006.01)

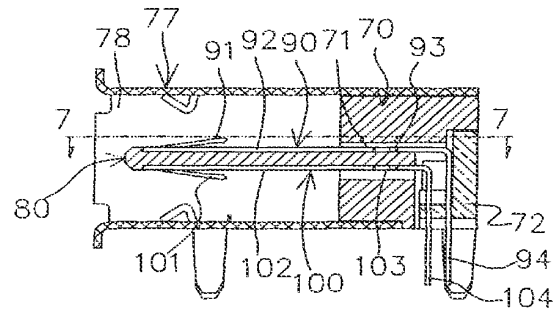
权利要求书 1 页 说明书 5 页 附图 10 页

(54) 实用新型名称

电连接插座结构

(57) 摘要

本实用新型提供一种电连接插座结构,其包括有:一塑料座体;一连接槽,其位于该塑料座体前端;一舌片,其设于该塑料座体前端并位于该连接槽内;及至少一排端子,其间隔排列位于该舌片一面,每一端子设有一接触部、一延伸部、一固定部及一接脚部,该延伸部向该舌片前端延伸,该接触部凸出该舌片一面,该接脚部伸出该塑料座体外;其特征在于该端子的延伸部板面平贴于该舌片一面,该接触部一端连接于该延伸部且由前而后渐凸出该延伸部板面并延伸至另一端成开放。



1. 一种电连接插座结构,其包括有:

一塑料座体;

一连接槽,其位于该塑料座体前端;

一舌片,其设于该塑料座体前端并位于该连接槽内;及

至少一排端子,其间隔排列位于该舌片一面,每一端子设有一接触部、一延伸部、一固定部及一接脚部,该延伸部向该舌片前端延伸,该接触部凸出该舌片一面,该接脚部伸出该塑料座体外;

其特征在于:该端子的延伸部板面平贴于该舌片一面,该接触部一端连接于该延伸部且由前而后渐凸出该延伸部板面并延伸至另一端成开放。

2. 如权利要求 1 所述的电连接插座结构,其特征在于,该舌片与该塑料座体一体成型。

3. 如权利要求 1 所述的电连接插座结构,其特征在于,还设有一金属外壳包覆该塑料座体,该金属外壳形成该连接槽。

4. 如权利要求 2 所述的双面电连接的电连接插座结构,其特征在于,该端子的固定部与该塑料座体固定。

5. 如权利要求 1 所述的电连接插座结构,其特征在于,该舌片为一电路板,该舌片一面设有多条第一电路,该第一电路于该舌片前段设有该第一接触部且于该舌片后段设有第一接点,该第一接点与一第一接脚电连接,该第一接触部位于该端子的接触部前方。

6. 如权利要求 5 所述的电连接插座结构,其特征在于,该端子的固定部与该舌片固定。

7. 如权利要求 1 所述的电连接插座结构,其特征在于,该端子的延伸部板面设有一较该接触部板面更大的缺口,该接触部往该延伸部板面压平时完全位于该缺口内。

8. 如权利要求 1 所述的电连接插座结构,其特征在于,该接触部往该延伸部板面压平时位于该延伸部一侧。

9. 如权利要求 1 所述的电连接插座结构,其特征在于,该连接槽与该塑料座体一体成型。

电连接插座结构

技术领域

[0001] 本实用新型是有关于一种电连接器,特别是指一种连接槽内具有舌片的电连接插座结构。

背景技术

[0002] 现今计算机最普及的信号传输规格莫过于通用序列总线 (Universal Serial Bus, 简称 USB), 以此规格制作的连接器插座及传输线可使外接于计算机的接口设备, 如鼠标、键盘等, 实时为计算机所测得并立即使用。

[0003] 为了满足高流量数据传输的需求, 目前有另一种随插即用的传输规格, 序列先进附加技术 (External Serial ATA, 简称 ESATA), 此规格传输值较 USB 为大。

[0004] 上述 USB 和 ESATA 的接口并不兼容, 惟两种所属的插座颇为类似然而无法共享。

[0005] 请参阅图 1, 为一种公知的信号线连接器, 其包括有一塑料座体 10、四个第一端子 20、七个第二端子 25 及一金属外壳 30, 其中:

[0006] 该塑料座体 10 设有一 USB 接头插槽 11 及一 ESATA 接头插槽 15, 该 USB 接头插槽 11 内设有一舌片 12, 该 ESATA 接头插槽 15 内设有一舌片 16。

[0007] 该第一端子 20 固定于该塑料座体 10, 其设有一可上下弹动的接触部 21 及一接脚 22, 该接触部 21 位于该 USB 接头插槽 11 内并凸出该舌片 12 下方, 该接脚 22 伸出塑料座体 10 下方藉以连接至一电路板 35。

[0008] 该第二端子 25 固定于该塑料座体 10, 其设有一不可弹动的接触部 26 及一接脚 27, 该接触部 26 位于该 ESATA 接头插槽 15 内并凸出该舌片 16 上方, 该接脚 27 伸出塑料座体 10 下方藉以连接至一电路板 35。

[0009] 该金属外壳体 30 包覆在该塑料座体的四周面及顶面, 其一面设有开孔 31、32, 藉以令 USB 接头插槽 11 及 ESATA 接头插槽 15 露出。

[0010] 请参阅图 2, 为一 USB2.0 接头 40, 其成方形, 其设有一塑料体 41、一外铁壳 42、及四个端子接点 43, 外铁壳 42 包覆塑料体 41 后其内形成有空间 44, 斜线区域为示意塑料体 41, 该四个端子接点 43 不具弹性且露出该空间 44, 请配合参阅图 1, 该 USB 接头 40 的空间 44 对应 USB 接头插槽 11 的舌片 12 插入作电连接, 此时其端子接点 43 即与第一端子 20 的接触部 21 弹性接触。

[0011] 请参阅图 3, 为一 ESATA 接头 45, 其大致成方形而两侧略为凸出, 其设有一塑料体 46、一外铁壳 47、及七个端子接点 48, 该塑料体 46 中间形成有空间 49, 斜线区域为示意塑料体 46, 该七个端子接点 48 具有上下弹动的弹性且露出该空间 49, 请配合参阅图 1, 该 ESATA 接头 45 的空间 49 对应 ESATA 接头插槽 15 的舌片 16 插入作电连接, 此时其端子接点 48 即与第二端子 25 的接触部 26 弹性接触。

[0012] 上述公知的信号线连接器上所设有 USB 接头插槽 11 仅能限定插入 USB 接头, 而 ESATA 接头插槽 15 则仅能限定插入 ESATA 接头, 即任一插槽没有共享功能, 然而由于目前计算机的功能需求日益增强, 依使用者不同需求, 计算机上可能只需连接上 4 条 USB 接头的信

号线而不需连接 ESATA 接头的信号线,亦有可能不需连接 USB 接头的信号线而需连接 4 条 ESATA 接头的信号线,如此计算机为配合使用者的不同需求,则必需分别各设置有 4 个 USB 接头插槽及 4 个 ESATA 接头插槽,如此相当占用空间且增加成本。

[0013] 为了使用上的方便性,目前已有有人设计 USB 接头的信号线和 ESATA 接头的信号线可共享的信号线插座结构。

[0014] 请参阅图 4 及图 5,为一种公知的共享插座结构,其包括有:一塑料座体 50、一排第一端子 56、一排第二端子 60 及一金属外壳 65,其中:

[0015] 该塑料座体 50 设有一共享槽 51,该共享槽 51 包括有一第一插槽 52 及一第二插槽 53,该第二插槽 53 的高度较第一插槽 52 为小且宽度较第一插槽 52 为宽,该第一、二插槽 52、53 具有共享空间,该第一插槽 52 可插入卡合一 USB 接头,该第二插槽 53 可插入卡合一 ESATA 接头,另设有一舌片 54 位于该共享槽 51 内,该舌片下面设有四个间隔排列的凹槽 55。

[0016] 该一排第一端子 56 共有四个间隔排列于该舌片 54 下面,其设有一可上下弹动的接触部 57 凸出该舌片 54 下面,该接触部 57 被压缩时会缩到该舌片 54 下面的凹槽 55。

[0017] 该一排第二端子 60 共有七个间隔排列于该舌片 54 上面,其平贴于舌片 54 上面且延伸至舌片 54 前段设有一不可弹动的接触部 61。

[0018] 该金属外壳 65 包覆于该塑料座体 50 外。

[0019] 上述公知设计有以下缺点:该第一端子 56 藉由该舌片 54 的凹槽 55 而可弹动,由于该舌片 54 的厚度有限,再让出该凹槽 55 的空间则所剩厚度很小,如此舌片 54 的强度变得很弱,且该第一端子 56 的弹动量亦很小,在电连接上并非良好。

[0020] 再者,舌片上面所设的第二端子若为可弹动者,则舌片厚度要形成第一、二端子的弹动空间更显得困难而不易达成。

实用新型内容

[0021] 本实用新型的主要目的在于提供一种电连接插座结构,其端子的可弹动的接触部不需利用该舌片的厚度来弹动,故可达到制造上的简便。

[0022] 为达上述目的,本实用新型电连接插座结构,其包括有:一塑料座体;一连接槽,其位于该塑料座体前端;一舌片,其设于该塑料座体前端并位于该连接槽内;及至少一排端子,其间隔排列位于该舌片一面,每一端子设有一接触部、一延伸部、一固定部及一接脚部,该延伸部向该舌片前端延伸,该接触部凸出该舌片一面,该接脚部伸出该塑料座体外;其特征在于该端子的延伸部板面平贴于该舌片一面,该接触部一端连接于该延伸部且由前而后渐凸出该延伸部板面并延伸至另一端成开放。

附图说明

[0023] 本实用新型的上述及其它目的、优点和特色由以下较佳实施例的详细说明中并参考图式可更加明白。

[0024] 图 1 是公知的信号线连接器的前视图。

[0025] 图 2 是公知 USB 接头前视示意图。

[0026] 图 3 是公知 eSATA 接头前视示意图。

- [0027] 图 4 是公知的共享插座结构前视图。
- [0028] 图 5 是公知的共享插座结构侧视剖面图。
- [0029] 图 6 是本实用新型第一实施例的侧视剖面图。
- [0030] 图 7 是本实用新型第一实施例的上视剖面图。
- [0031] 图 8 是本实用新型第一实施例的前视图。
- [0032] 图 9 是本实用新型第一实施例的使用状态图。
- [0033] 图 9A 是本实用新型第一实施例的使用状态前视示意图。
- [0034] 图 10 是本实用新型第一实施例的使用状态图。
- [0035] 图 10A 是创作第一实施例的使用状态前视示意图。
- [0036] 图 11 是本实用新型第二实施例的侧视剖面图。
- [0037] 图 12 是本实用新型第二实施例的上视剖面图。
- [0038] 图 13 是本实用新型第三实施例的前视图。
- [0039] 图 14 是本实用新型第三实施例的侧视剖面图。
- [0040] 图 15 是本实用新型第四实施例的立体分解图。
- [0041] 图 16 是本实用新型第四实施例的前视立体图。
- [0042] 图 17 是本实用新型第四实施例的舌片底视立体图。
- [0043] 图 18 是本实用新型第五实施例的前视图。
- [0044] 图 19 是本实用新型第五实施例的侧视剖面图。

具体实施方式

[0045] 请参阅图 6、图 7、及图 8，为本实用新型第一实施例，为一双面导接的 USB2.0 插座，其包括：一塑料座体 70、一金属外壳 77、一舌片 80、一排第一端子 90、及一排第二端子 100，其中：

[0046] 该塑料座体 70 设有二排端子卡槽 71 且后端由下而上盖合一后盖 72。

[0047] 该金属外壳 77 包覆该塑料座体 70，该金属外壳的前段形成一连接槽 78。

[0048] 该舌片 80 与该塑料座体 70 一体注射成型，该舌片 80 呈水平位设于该塑料座体 70 前端并位于该连接槽 78 内中间高度，该舌片 80 上、下面各设有 4 个间隔排列的凹面 81。

[0049] 该一排第一端子 90 共计 4 支呈间隔排列固定于该塑料座体 70，该第一端子 90 一体设有一接触部 91、一延伸部 92、一固定部 93 及一接脚部 94，该固定部 93 与该塑料座体 70 的端子卡槽 71 固定，该延伸部 92 向舌片 80 前端延伸，该延伸部 92 板面平贴于该舌片 80 上面的凹面 81 且与该舌片 80 上面齐平，该延伸部 92 前段板面设有一较该接触部 91 板面大的缺口 95，该接触部 91 一端连接于该延伸部 92 且由前而后渐凸出该延伸部 92 板面并延伸至另一端成开放，如此该接触部 91 凸出该舌片 80 上面并可上下弹动，该接脚部 94 伸出该塑料座体 70 外。

[0050] 该一排第二端子 100 共计 4 支呈间隔排列固定于该塑料座体 70，该第二端子 100 构造与该第一端子 90 完全相同，该第二端子 100 同样一体设有一接触部 101、一延伸部 102、一固定部 103 及一接脚部 104，该固定部 103 与该塑料座体 70 的端子卡槽 71 固定，该延伸部 102 板面平贴于该舌片 80 下面的凹槽 81 且与该舌片 80 下面齐平，该接触部 101 凸出该舌片 80 下面，该接脚部 104 伸出该塑料座体 70 外。

[0051] 藉由以上构造,请参阅图 9 及图 9A,为一信号线的 USB2.0 接头使用状态图,该 USB2.0 接头 40 正向插入连接槽 78 时,其空间 44 为该舌片 80 所套入,其一排接点 41 与舌片 80 下方的该第二端子 100 的接触部 101 电连接,此时该接触部 101 被该 USB2.0 接头 40 压平而平贴于该舌片 80 下面;请参阅图 10 及图 10A,USB2.0 接头 40 反向插入连接槽 78 时,其空间 44 亦为该舌片 80 所套入,其一排接点 41 与舌片 80 上方的该第一端子 90 的接触部 91 电连接,此时该接触部 91 被该 USB2.0 接头 40 压平而平贴于该舌片 80 上面。

[0052] 藉由以上的说明,可知本实施例可供 USB2.0 接头正反双向插入电连接,达到使用上的方便性,本实施例的舌片 80 虽两面皆各设有二排可弹动的接触部,然而该可弹动的接触部不需利用该舌片的厚度来弹动,故该二排接触部可易于设置,不会造成制造上的困难。

[0053] 请参阅图 11 及图 12,是本实用新型第二实施例,其大致与第一实施例相同,其差异在于本实施例的第一端子 90 的接触部 91 往延伸部 92 板面压平时位于该延伸部 92 一侧,该第二端子 100 构造与该第一端子 90 完全相同。

[0054] 请参阅图 13 及图 14,是本实用新型第三实施例,其为 USB2.0 接头和 ESATA 接头的共享插座,其包括:一塑料座体 70、一金属外壳 75、一舌片 80、一排第一端子 90、及一排第二端子 100,其中:

[0055] 该塑料座体 70 设有二排端子卡槽 71 且后端由下而上盖合一后盖 72,该塑料座体 70 内设有一连接槽 73,该连接槽 73 包括有一第一插槽 74 及一第二插槽 75,该第二插槽 75 的高度较第一插槽 74 为小且宽度较第一插槽 74 为宽,该第一、二插槽 74、75 具有共享空间,该第一插槽 74 可插入卡合一 USB 接头,该第二插槽 75 可插入卡合一 ESATA 接头。

[0056] 该金属外壳 77 包覆该塑料座体 70。

[0057] 该舌片 80 与该塑料座体 70 一体注射成型,该舌片 80 呈水平位设于该塑料座体 70 前端并位于该连接槽 73 内偏上高度,该舌片 80 上、下面各设有 4 个间隔排列的凹面 81。

[0058] 该一排第一端子 90 共计 4 支呈间隔排列固定于该塑料座体 70,该第一端子 90 与第一实施例相同,其同样一体设有一接触部 91、一延伸部 92、一固定部 93 及一接脚部 94。

[0059] 该一排第二端子 100 共计 7 支呈间隔排列固定于该塑料座体 70,该第二端子 100 一体设有一接触部 101、一延伸部 102、一固定部 103 及一接脚部 104,该固定部 103 与该塑料座体 70 的端子卡槽 71 固定,该接触部 101 和延伸部 102 板面平贴于该舌片 80 上面的凹槽 81 且与该舌片 80 上面齐平,该接脚部 104 伸出该塑料座体 70 外。

[0060] 请参阅图 15、图 16 及图 17,是本实用新型第四实施例,其为 USB3.0 接头和 ESATA 接头的共享插座,其包括:一塑料座体 70、一金属外壳 75、一舌片 80、一排第一端子 90、及一排第二端子 100,其中:

[0061] 该塑料座体 70 设有一水平方向的穿孔 76,该穿孔两侧设有卡槽,且后端由下而上盖合一后盖 72。

[0062] 该金属外壳 77 包覆该塑料座体 70,该金属外壳 77 的前段和该塑料座体 70 的前段共同形成一连接槽 73,即该塑料座体 70 形成该连接槽 73 的两侧,该金属外壳 77 形成该连接槽 73 的上、下面,该连接槽 73 与第三实施例相同为 USB 接头和 ESATA 接头的共享槽。

[0063] 该舌片 80 为一电路板,该舌片 80 呈水平位设于该塑料座体 70 前端并位于该连接槽 73 内,该舌片 80 上面设有 5 条第一电路 83,该第一电路 83 于该舌片 80 前段设有一第一接触部 84 且于该舌片后段设有一第一接点 85,该第一接点与一第一接脚 120 电连接,该舌

片 80 下面设有 7 条第二电路 86, 该第一电路 86 于该舌片 80 前段设有一第二接触部 87 且于该舌片 80 后段设有一第二接点 88, 该第二接点与一第二接脚 125 电连接, 该舌片 80 穿过该塑料座体 70 的穿孔 76, 其两侧设有凸部 89 与穿孔 76 两侧的卡槽卡定。

[0064] 该一排第一端子 90 共计 4 支呈间隔排列固定于该舌片 80 上, 该第一端子 90 构造与与第一实施例完全相同, 其固定部 93 焊接固定于该舌片 80 上, 该第一电路 83 的第一接触部 84 位于该第一端子 90 的接触部 91 前方。

[0065] 本实施例为一种沈板式设计, 即当连接于主机板时部份沈入主机板中, 故该第一端子 90 的接脚 94、第一接脚 120 及第二接脚 125 的长度均较前实施例为短。

[0066] 请参阅图 18 及图 19, 是本实用新型第五实施例, 其为一双面导接的 USB3.0 插座, 其大致与第一和第四实施例相同, 该舌片 80 为一电路板, 该舌片 80 上面焊接固定有四个第一端子 90 且设有 5 条第一电路 83, 该第一电路 83 于该舌片 80 前段设有一第一接触部 84 位于该第一端子 90 的接触部 91 前方, 同样舌片 80 下面焊接固定有四个第二端子 100 且设有 5 条第二电路 86, 该第二电路 86 于该舌片 80 前段设有一第二接触部 87 位于该第二端子 100 的接触部 101 前方。

[0067] 【主要组件符号说明】

[0068]	塑料座体 70	端子卡槽 71	后盖 72	连接槽 73
[0069]	第一插槽 74	第二插槽 75	穿孔 76	金属外壳 77
[0070]	连接槽 78	舌片 80	凹面 81	第一电路 83
[0071]	第一接触部 84	第一接点 85	第二电路 86	第二接触部 87
[0072]	第二接点 88	凸部 89		
[0073]	第一端子 90	接触部 91	延伸部 92	固定部 93
[0074]	接脚部 94	缺口 95	第二端子 100	接触部 101
[0075]	延伸部 102	固定部 103	接脚部 104	第一接脚 120
[0076]	第二接脚 125			

[0077] 在较佳实施例的详细说明中所提出的具体的实施例, 仅是为了易于说明本实用新型的技术内容, 而并非将本实用新型狭义地限制于该实施例。在不超出本实用新型的精神及以下申请专利范围的情况, 可作种种变化实施。

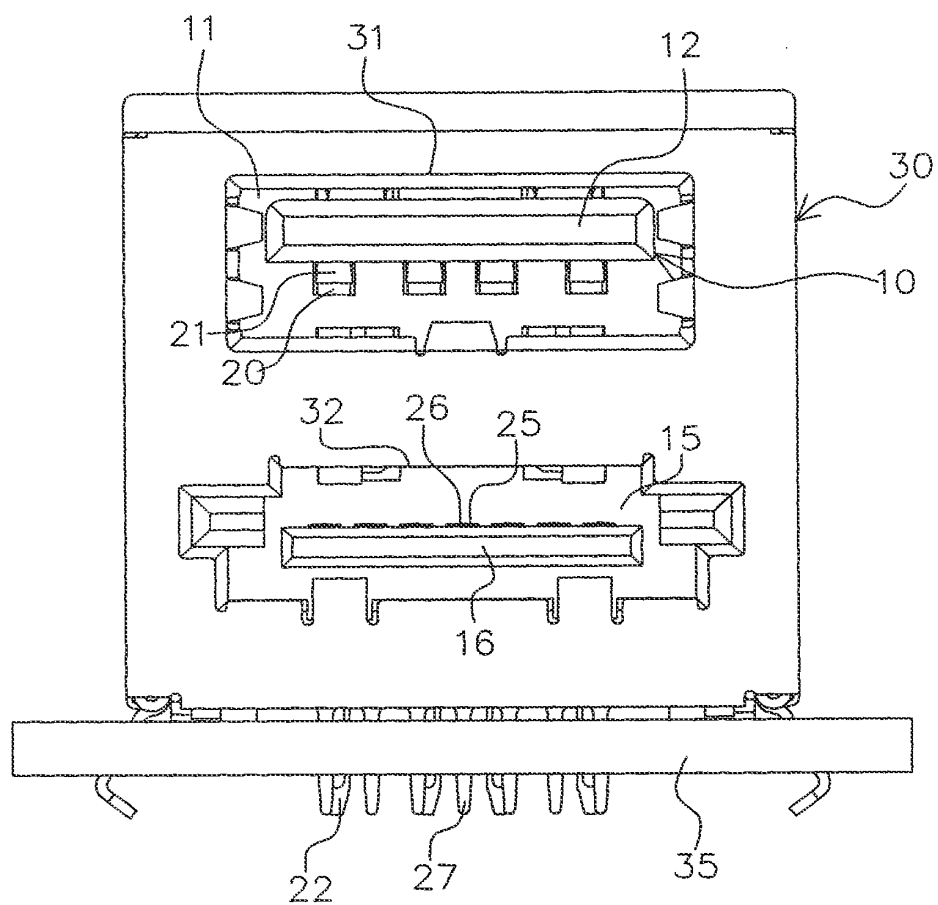


图 1

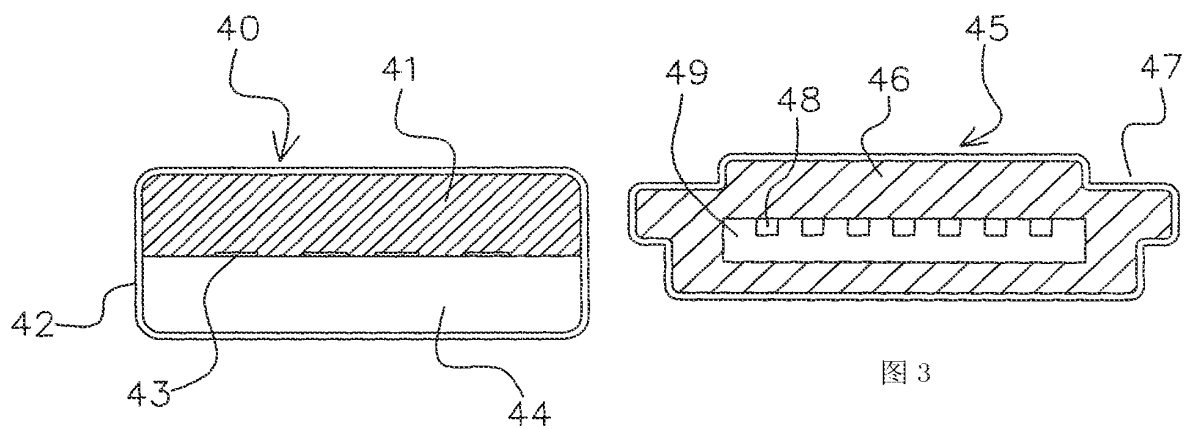


图 2

图 3

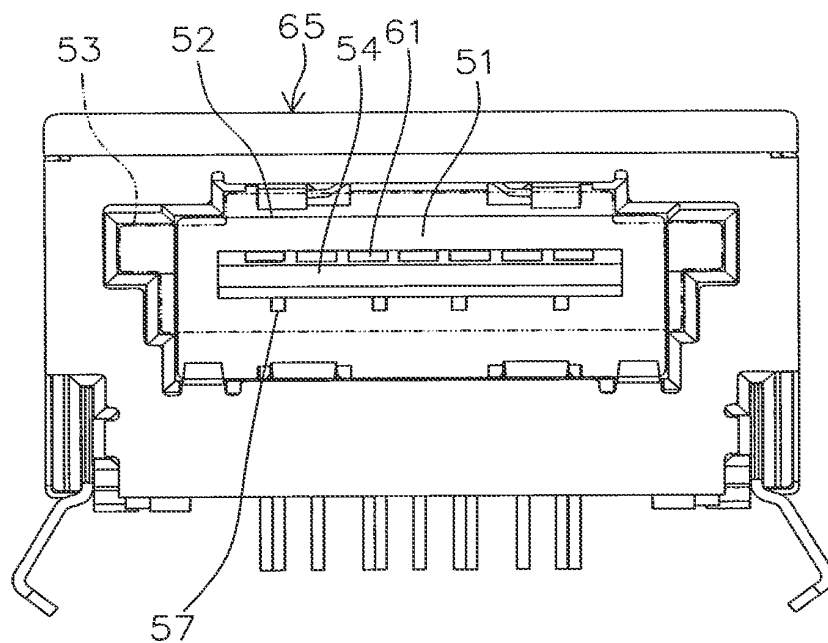


图 4

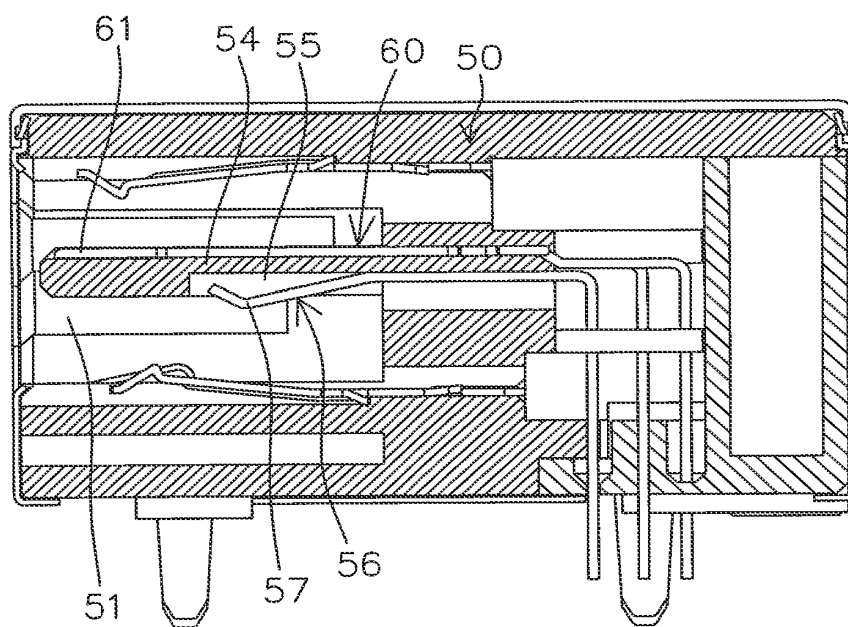


图 5

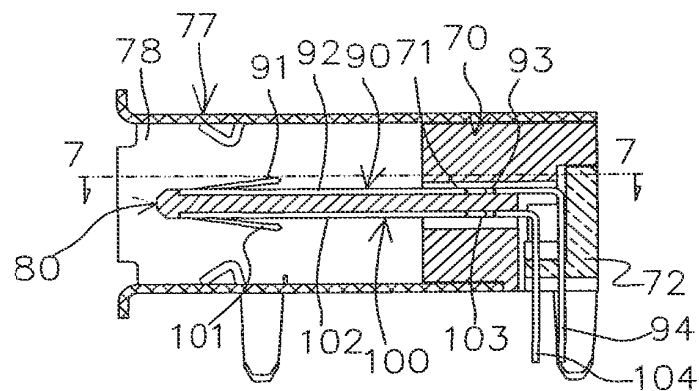


图 6

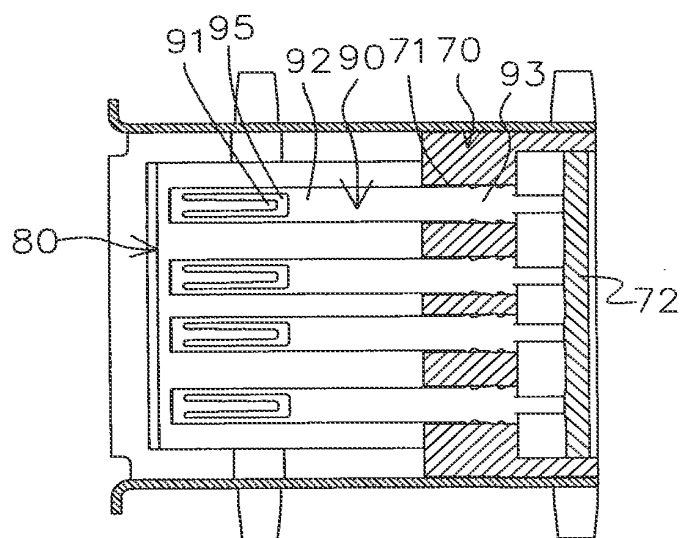


图 7

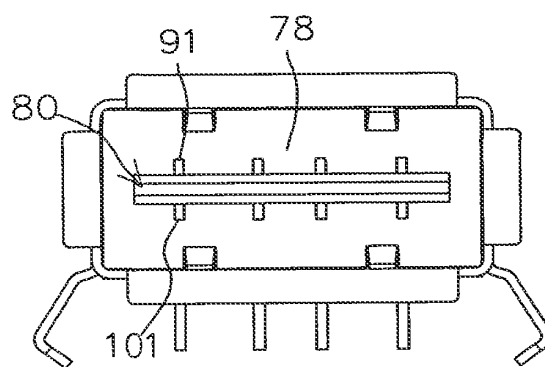


图 8

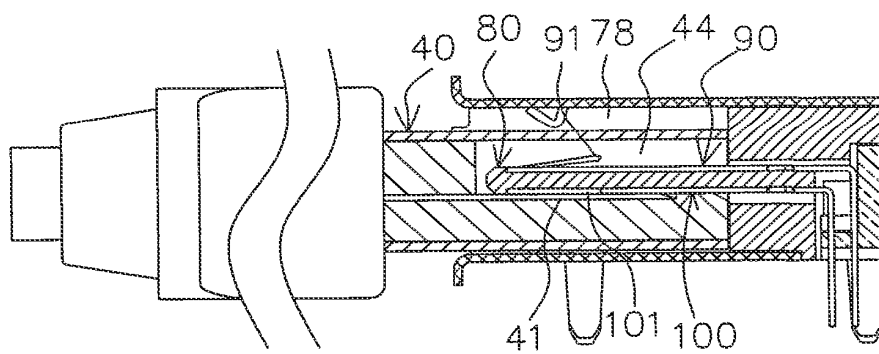


图 9

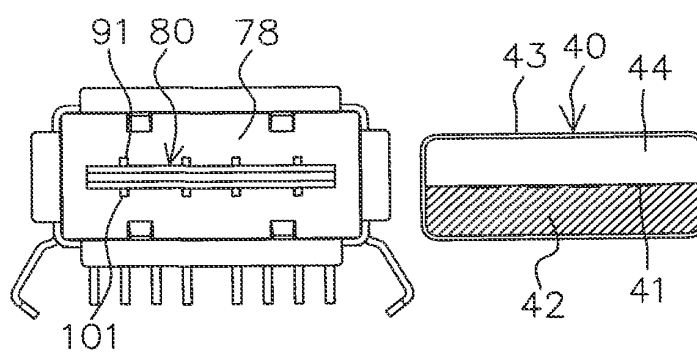


图 9A

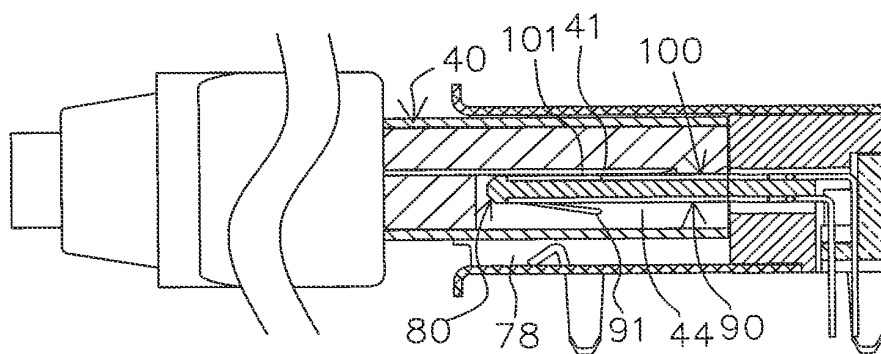


图 10

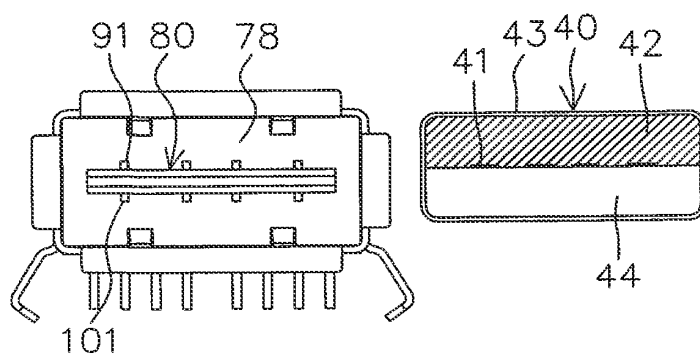


图 10A

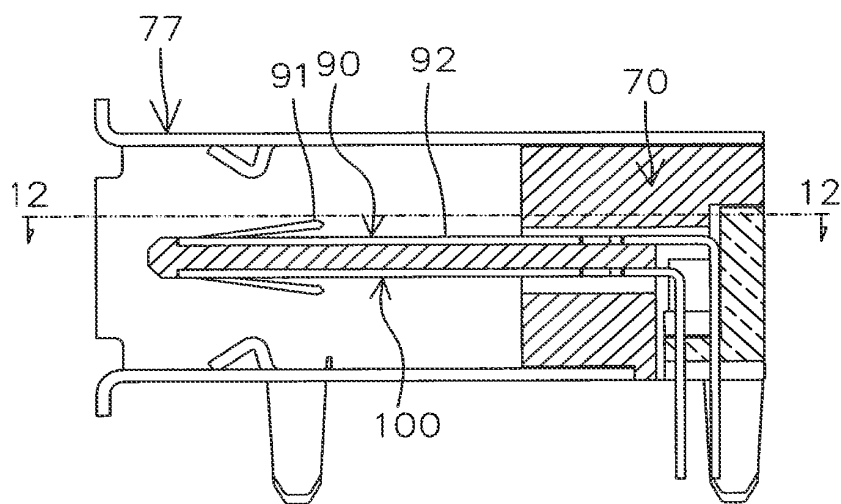


图 11

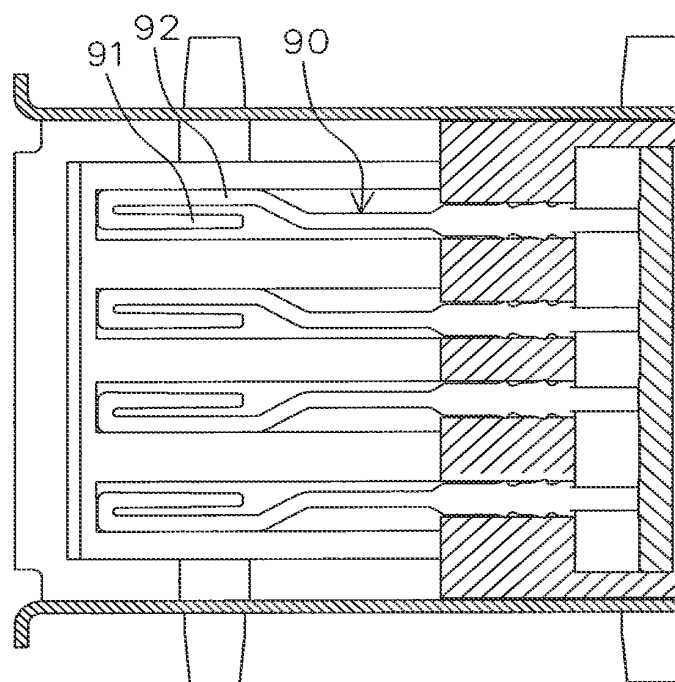


图 12

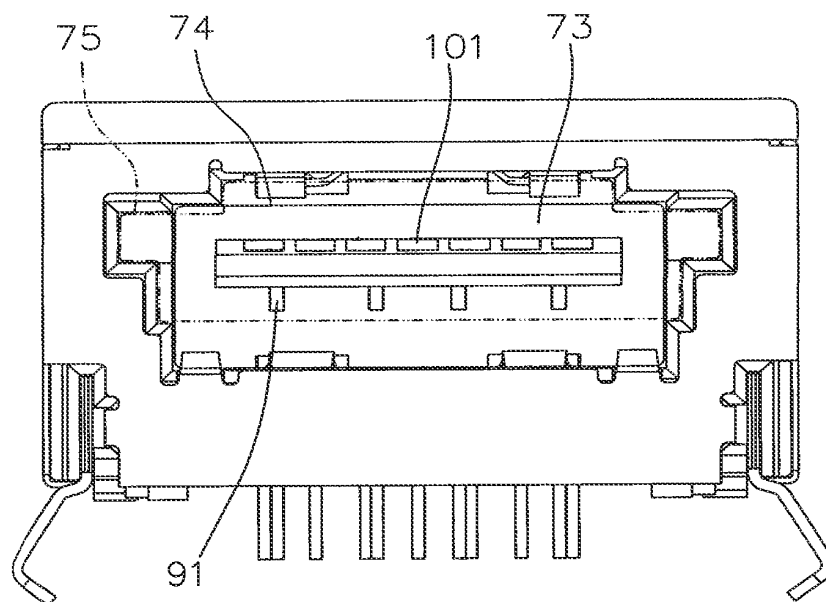


图 13

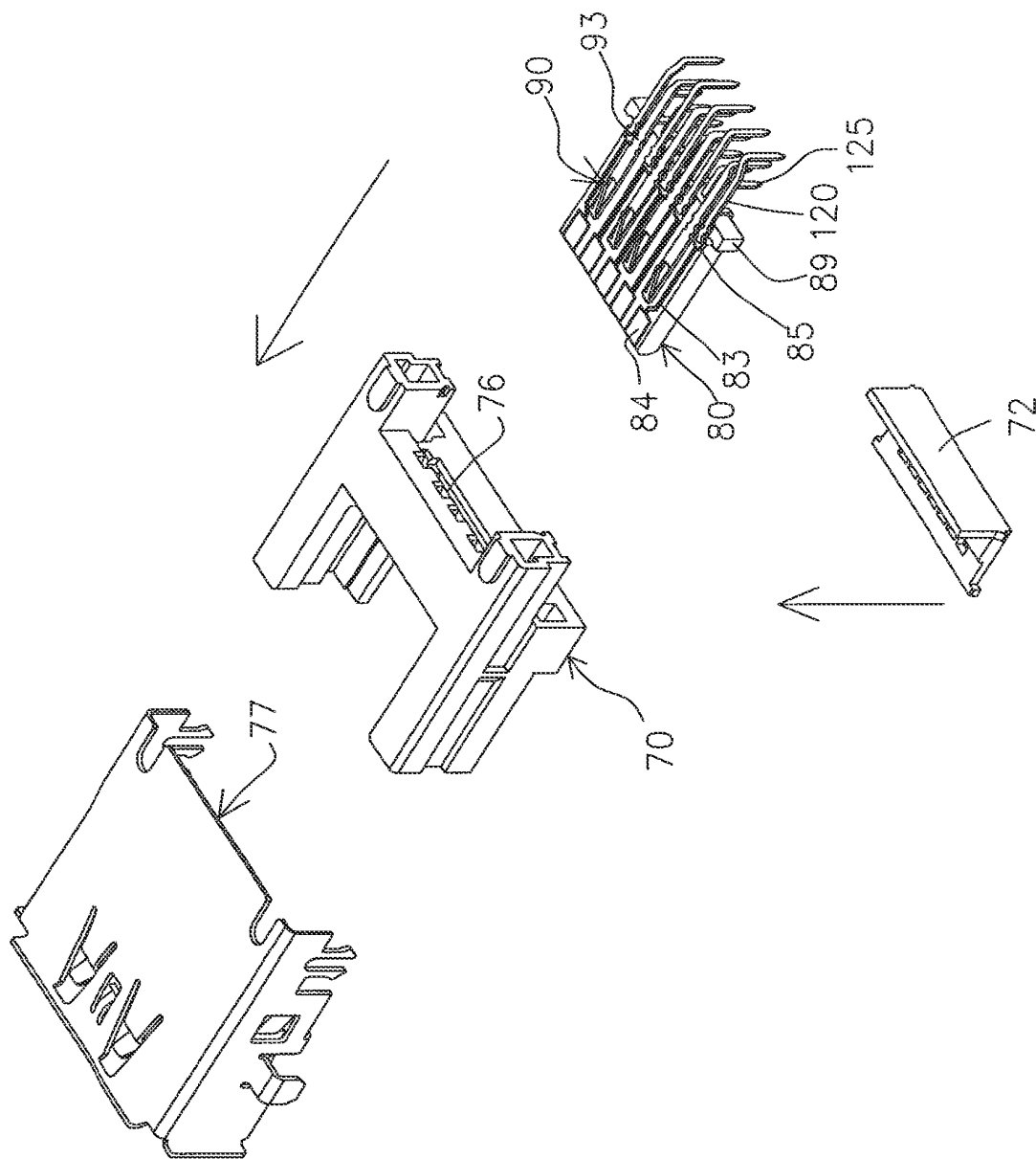


图 15

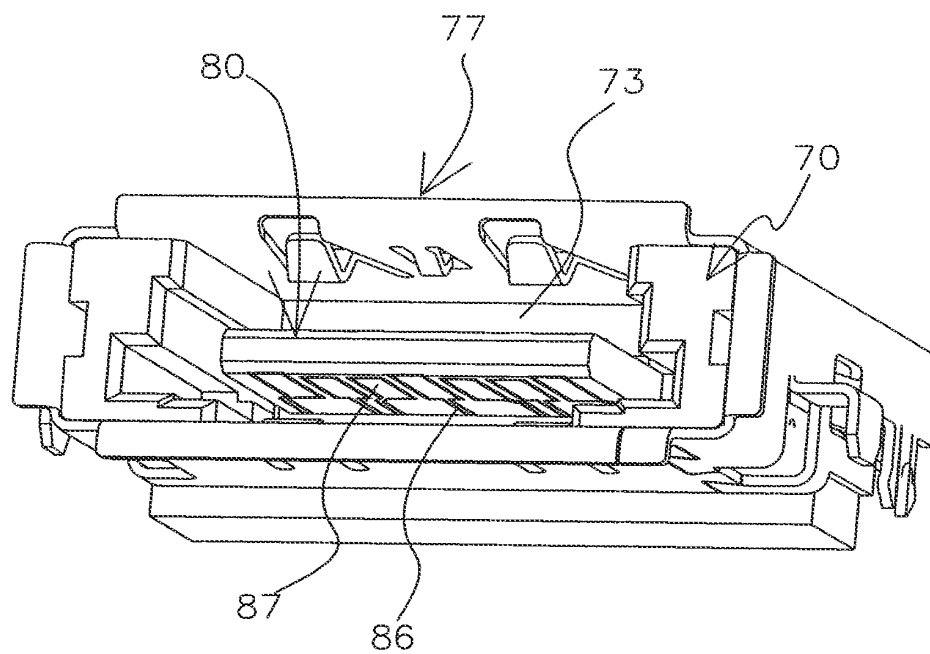


图 16

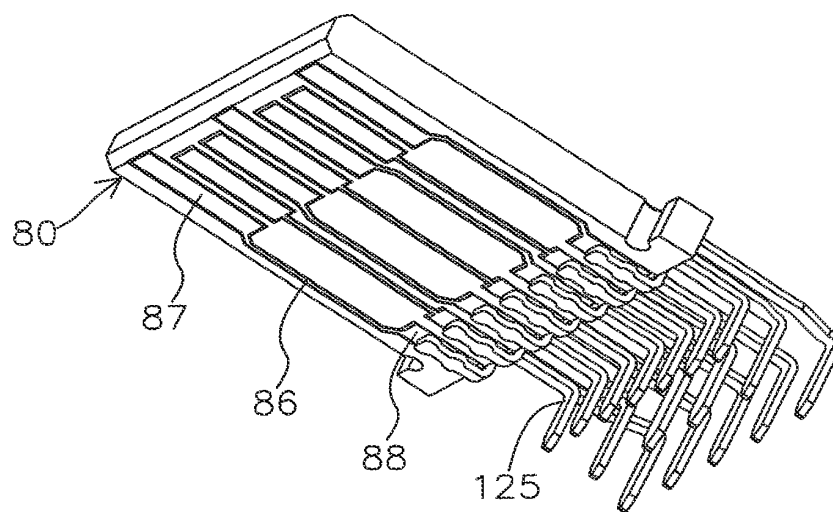


图 17

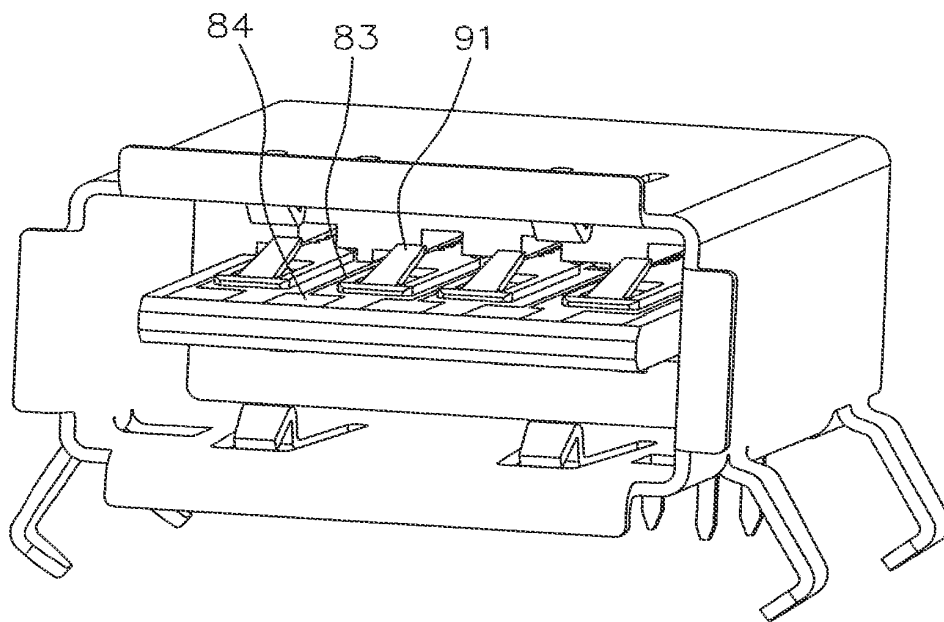


图 18

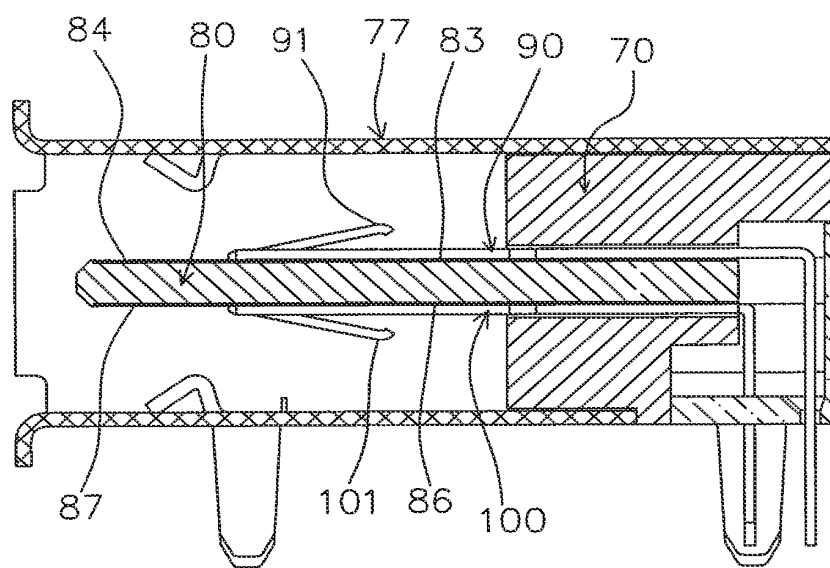
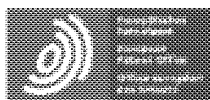


图 19



Espacenet

Bibliographic data: CN201303129 (Y) — 2009-09-02**Electrical connector**

Inventor(s): ZHOUXIAN CAI [CN] ± (CAI ZHOUXIAN)
Applicant(s): ZHOUXIAN CAI [CN] ± (CAI ZHOUXIAN)
Classification: - **international:** *H01R13/62*
- **cooperative:**
Application number: CN200820207374U 20080829
Priority number(s): CN200820207374U 20080829

Abstract of CN201303129 (Y)

Disclosed is an electrical connector, which is arranged on a main circuit board to be connected with a circuit board and lock and locate the circuit board. The electrical connector comprises a plastic base, a plurality of terminals, a locking plate structure and at least one back-locking elastic plate, wherein the plastic base fixed on the main circuit board is provided with a connecting groove with a forward opening, one end of the circuit board can be inserted in the connecting groove, the terminals are arranged on the plastic base, each terminal is provided with a protruding contact disposed in the connecting groove, the locking plate structure is arranged in a distance at the front of the plastic base and fixed on the main circuit board, the locking plate structure is provided with at least one snap-fit portion, when the circuit board is inserted in the connecting groove to be located, the snap-fit portion can lock the other end of the circuit board, the back-locking elastic plate is arranged on the plastic base, when one end of the circuit board is inserted in, the back-locking elastic plate can be compressed, when the back-locking elastic plate is rebounded to push the circuit board in a stroke, the other end of the circuit board can be locked by the snap-fit portion.

[19] 中华人民共和国国家知识产权局

[51] Int. Cl.

H01R 13/62 (2006.01)

H01R 12/22 (2006.01)

H01R 13/633 (2006.01)



[12] 实用新型专利说明书

专利号 ZL 200820207374.0

[45] 授权公告日 2009 年 9 月 2 日

[11] 授权公告号 CN 201303129Y

[22] 申请日 2008.8.29

[21] 申请号 200820207374.0

[73] 专利权人 蔡周贤

地址 中国台湾台北县

[72] 发明人 蔡周贤

[74] 专利代理机构 永新专利商标代理有限公司

代理人 李树明

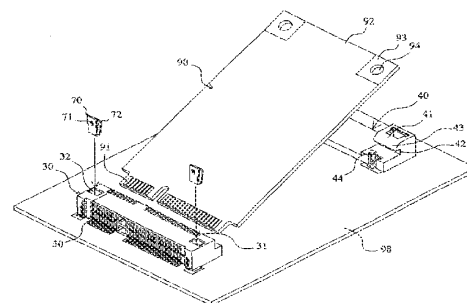
权利要求书 1 页 说明书 5 页 附图 6 页

[54] 实用新型名称

电连接器

[57] 摘要

一种电连接器，其设于一主电路板上，借以连接一电路板并卡扣定位该电路板，其包括有：一塑胶座体，其固定于该主电路板上，其设有一开口向前的连接槽，该连接槽可供该电路板一端插入连接；多个端子，其是设于该塑胶座体，每一端子设有凸出的接点位于该连接槽；一卡板构造，其是设于该塑胶座体前方一段距离并固定于该主电路板上，其设有至少一卡扣部，当该电路板插入连接槽定位时该卡扣部可卡定该电路板的另一端；及至少一退卡弹片，其是设于该塑胶座体，该电路板一端插入时会压缩该退卡弹片，当该退卡弹片回弹将该电路板推出一行程可使该电路板另一端为该卡扣部卡定。



1. 一种电连接器，其是设于一主电路板上，借以连接一电路板并卡扣定位该电路板，其特征在于：包括有：

一塑胶座体，其固定于该主电路板上，其设有一开口向前的连接槽，该连接槽可供该电路板一端插入连接；

多个端子，其是设于该塑胶座体，每一端子设有凸出的接点位于该连接槽；

一卡板构造，其是设于该塑胶座体前方一段距离并固定于该主电路板上，其设有至少一卡扣部，当该电路板插入连接槽定位时该卡扣部可卡定该电路板的另一端；及

至少一退卡弹片，其是设于该塑胶座体，该电路板一端插入时会压缩该退卡弹片，当该退卡弹片回弹将该电路板推出一行程可使该电路板另一端为该卡扣部卡定。

2. 如权利要求 1 所述的电连接器，其特征在于：该塑胶座体两侧各设有一退卡弹片槽，该退卡弹片设于该退卡弹片槽，该退卡弹片槽与连接槽相通，该退卡弹片一端位于连接槽。

3. 如权利要求 2 所述的电连接器，其特征在于：该退卡弹片成 U 形状。

4. 如权利要求 1 所述的电连接器，其特征在于：该多个端子包括一排上端子及一排下端子，该下端子设有凸向上的接点，该上端子设有凸向下的接点且位于下端子的接点后方及上方。

5. 如权利要求 1 所述的电连接器，其特征在于：所述卡扣部的数目为两个，该二卡扣部分别设于该卡板构造的二侧。

电连接器**【技术领域】**

本实用新型是关于一种电连接器，特别是关于一种连接电路板的电连接器。

【背景技术】

请参阅图1及图2，为一种现有的电连接器组合，其包括有一电连接器10、一电路板25及一主电路板28，其中：

该电连接器设有：一塑胶座体10，其设有一开口朝前的插槽11，该插槽11内设有间隔排列的上端子12及下端子13，该塑胶座体10固定于该主电路板28上，该上端子12及下端子13分别设有接脚与主电路板28电连接；及一卡板构造20，其设于该塑胶座体10的前方一段距离且固定于主电路板28上，其设有一定位柱21及一弹性卡勾22。

该电路板25的前端的上下面皆设有间隔排列的接点26，另一端设有一卡孔27。

该电路板25在连接时是将前端的接点26呈斜向插入电连接器的插槽11，再将另一端压下，使电路板25的卡接孔27套入该卡接柱21，电路板25的后端为该弹性卡勾22所卡扣。

上述现有构造有以下缺点：

1. 电路板25后端为该弹性卡勾22弹性卡扣，如此在卡定上并非很确实的卡扣，因为弹性卡勾是可弹性扳开的，当作冲击测试时，该弹性卡勾22受到大冲击力时会产生脱扣。

2. 在电连接上，如图2所示，电路板25转平后，电路板25的上面接点26是会后退，而下面接点26是会前进，如此电路板25的上面接点26尚可充份刮除氧化层（插入时前进磨擦，转平时再退回磨擦），然而下面接点26并无后退行

程，且水平移动磨擦行程甚短，故其与下端子13的接触位置并未有充份刮除氧化层，电连接效果不佳。

【实用新型内容】

本实用新型的主要目的在于提供一种电连接器，当电路板插入连接时，其插入后可退出一行程后再被卡定，达到电路板的两面接点均能充份刮除氧化层且可稳固卡定电路板。

为达上述目的，本实用新型电连接器是设于一主电路板上，借以连接一电路板并卡扣定位该电路板，其包括有：一塑胶座体，其固定于该主电路板上，其设有一开口向前的连接槽，该连接槽可供该电路板一端插入连接；多个端子，其是设于该塑胶座体，每一端子设有凸出的接点位于该连接槽；一卡板构造，其是设于该塑胶座体前方一段距离并固定于该主电路板上，其设有至少一卡扣部，当该电路板插入连接槽定位时该卡扣部可卡定该电路板的另一端；及至少一退卡弹片，其是设于该塑胶座体，该电路板一端插入时会压缩该退卡弹片，当该退卡弹片回弹将该电路板推出一行程可使该电路板另一端为该卡扣部卡定。

本实用新型的优点在于：该电路板借由推入及退出一行程，其两面的接点可与第一、二端子磨擦刮除氧化层，因而具有良好的电连接效果。该电路板借由水平退出一行程，可使其一端被该卡板构造的卡扣部卡定，而该卡扣部不会弹动，故可很稳固的卡扣电路板。

本实用新型的上述及其他目的、优点和特色由以下较佳实施例的详细说明中并参考图式当可更加明白，其中：

【图式的简单说明】

图1 是现有电连接器组合的电路板斜向插入时侧视图。

图2 是现有电连接器组合的电路板卡扣定位时侧视图。

图3 是本实用新型第一实施例的立体分解图。

图4 是本实用新型第一实施例的侧视分解图。

图5 是本实用新型第一实施例的使用状态侧视图。

图6 是本实用新型第一实施例的使用状态侧视图。

图7 是本实用新型第一实施例的使用状态侧视图。

图8 是本实用新型第一实施例的使用状态侧视图。

图9 是本实用新型第二实施例的立体分解图。

图10是本实用新型第二实施例的立体组合图。

电路板90	接点91	一端92	导电区93
穿孔94	主电路板98		
塑胶座体30	连接槽31	退卡弹片槽32	
卡板构造40	卡扣部41	导斜面43	卡面42
接地勾片44			
第一端子 50	接点 51	接脚 52	
第二端子 60	接点 61	接脚 62	
退卡弹片70	倒勾71	受力端72	

【具体实施方式】

请参阅图3及图4，本实施例是设于一主电路板98上，借以连接一电路板90并卡扣定位该电路板90，其包括有一塑胶座体30、一排第一端子50、一排第二端子60、一卡板构造40、二退卡弹片70，其中：

该电路板90的一端两面皆设有间隔排列的接点91，另一端92的两侧设有导电区93，该导电区93设有一穿孔94。

该塑胶座体30固定于该主电路板98上，其设有一开口向前的连接槽31，该连接槽31可供该电路板90一端插入连接，该连接槽31的两侧各设有一退卡弹片槽32，该退卡弹片槽32与连接槽31相通。

该一排第一端子50及一排第二端子60是间隔排列设于该塑胶座体30，其中该第二端子60设有凸向上的接点61，该第一端子50设有凸向下的接点51且位于下端子的接点61后方及上方，借此提供电路板28向上跳起的力量，

该接点 51、61 皆位于该连接槽 31，该第一端子 50 及第二端子 60 分别设有呈水平的接脚 52、62 与主电路板 98 电接。

该二退卡弹片 70 组装于该塑胶座体 30 两侧的退卡弹片槽 32，其呈 U 形状，其一端设有倒勾 71 卡勾于塑胶座体，另一端为受力端 72 位于该连接槽 31，该电路板 90 插入时会压缩该退卡弹片 70 的受力端 72。

该卡板构造 40 设于该塑胶座体 30 前方一段距离并固定于该主电路板 98 上，其两侧各设有一卡扣部 41 及一接地勾片 44，该卡扣部 41 设有一导斜面 43 及一水平的卡面 42，当该电路板 90 插入连接槽 31 定位时该两卡扣部 41 可卡定该电路板的另一端 92，且该接地勾片 44 可穿过穿孔 94 勾于导电区 93。

使用时的操作动作如下，请参阅图 5，电路板 90 呈斜向插入连接槽 31，此时接点 91 未受第一端子 50 及第二端子 60 弹性抵压，且尚未压缩该退卡弹片 70；请参阅图 6，将电路板 90 压下抵于卡板构造 40 的两卡扣部 41 上，此时接点 91 受到第一端子 50 及第二端子 60 弹性抵压；请参阅图 7，再压下电路板 90 时其一端 92 沿着卡扣部 41 的导斜面 43 压下而使电路板 90 再插入一段行程，此时电路板 90 压缩该退卡弹片 70 的受力端 72；请参阅图 8，当松手时，该退卡弹片 70 回弹将电路板 90 推出一行程，此时电路板 90 的一端 92 即为卡扣部 41 的卡面 42 卡扣定位。

当要取板时，则只需将电路板 90 往连接槽 31 推一行程，使电路板 90 的一端 92 脱离该卡板构造 40 的卡扣部 41 卡扣即可跳开，如此即可取出该电路板 90。

由以下的说明，本发明归纳具有以下优点：

1. 该电路板 90 借由推入及退出一行程，其两面的接点 91 可与第一、二端子 50、60 磨擦刮除氧化层，因而具有良好的电连接效果。
2. 该电路板 90 借由水平退出一行程，可使其一端被该卡板构造 40 的卡扣部 41 卡定，而该卡扣部 41 不会弹动，故可很稳固的卡扣电路板 90。

请参阅图9及图10，为本实用新型的第二实施例，其大致与第一实施例相同，其差异在于该卡板构造40设有一接地弹片46，当电路板一端为卡扣部41卡扣时，电路板的导电区可与该接地弹片46导接，当电路板一端脱离卡扣部41

卡扣时，可借由该接地弹片46增加电路板向上弹起的力量。

在较佳实施例的详细说明中所提出的具体的实施例仅为了易于说明本实用新型的技术内容，而并非将本实用新型狭义地限制于该实施例，在不超出本实用新型的精神及申请专利范围的情况，可作种种变化实施。

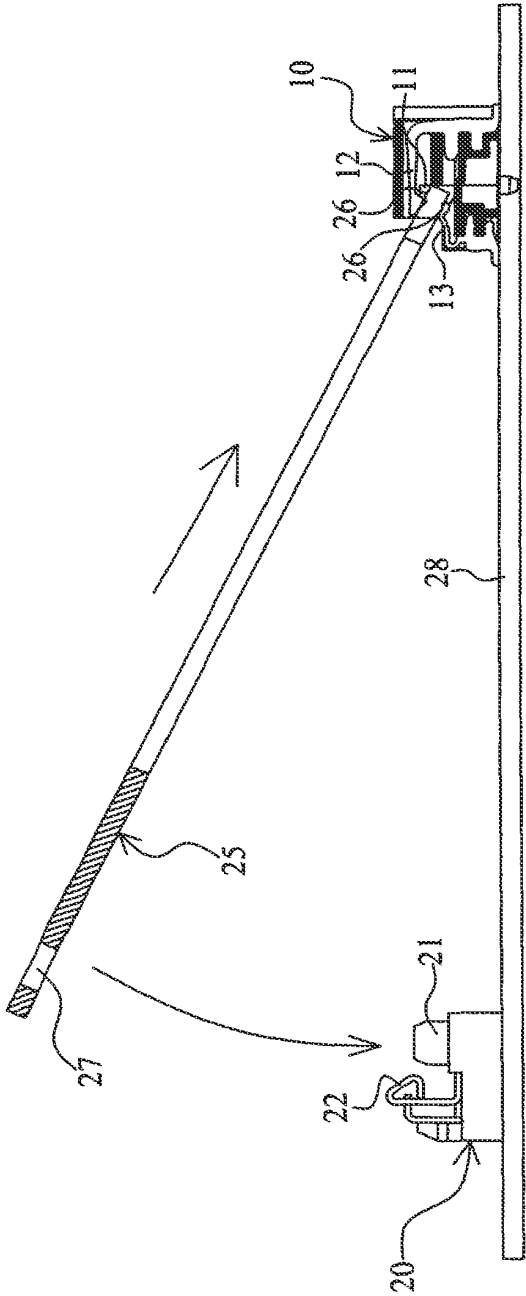


图 1

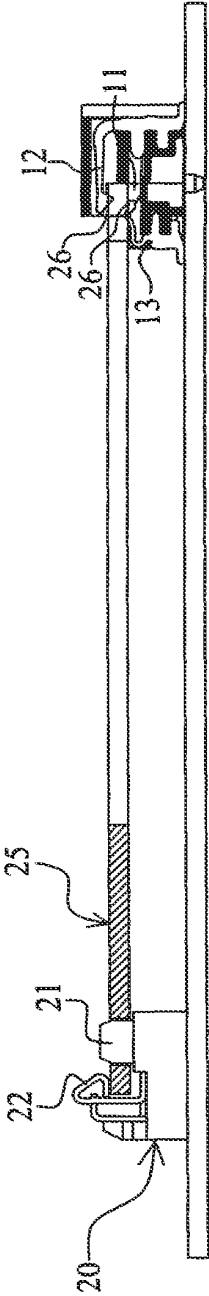


图 2

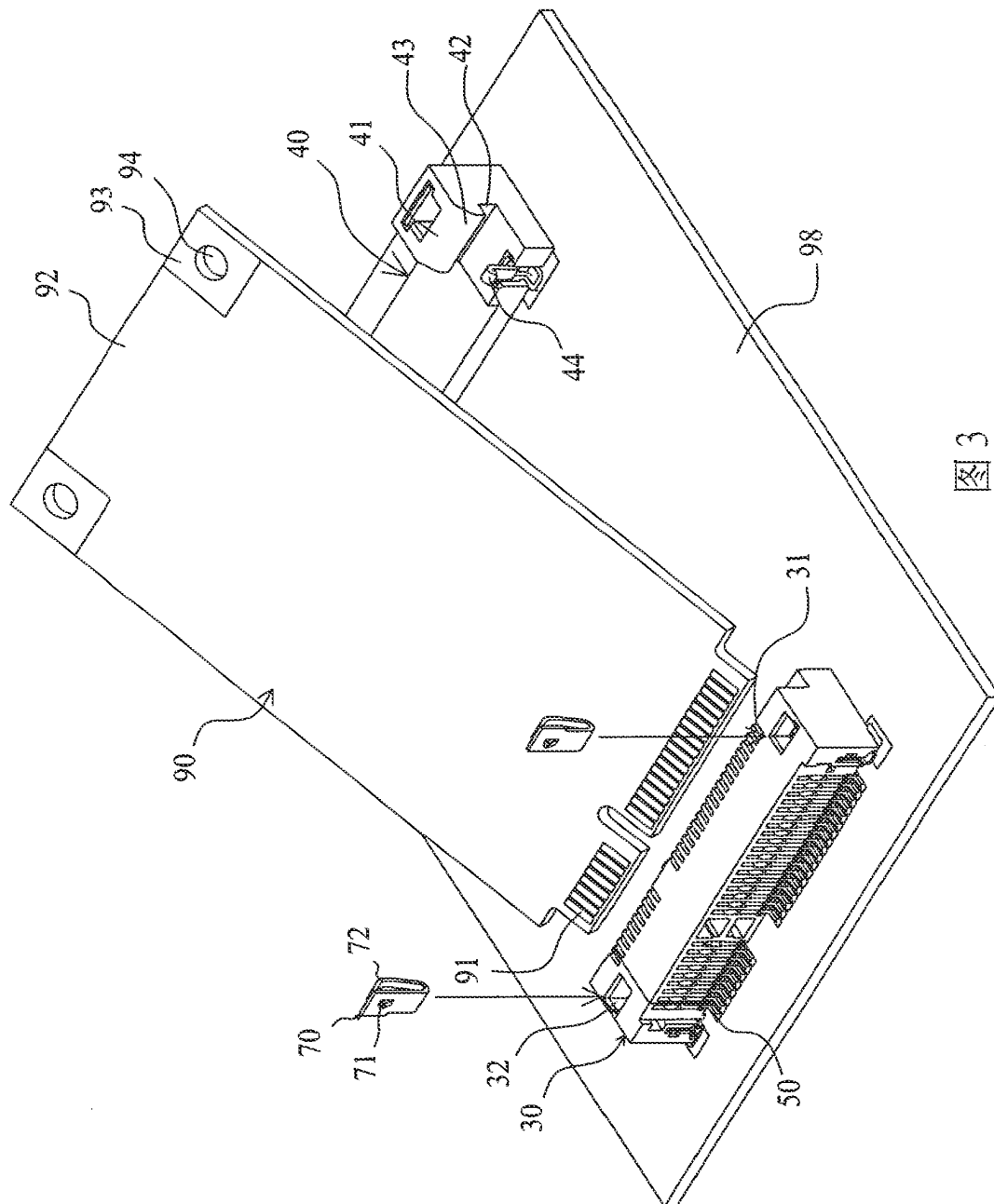


图 3

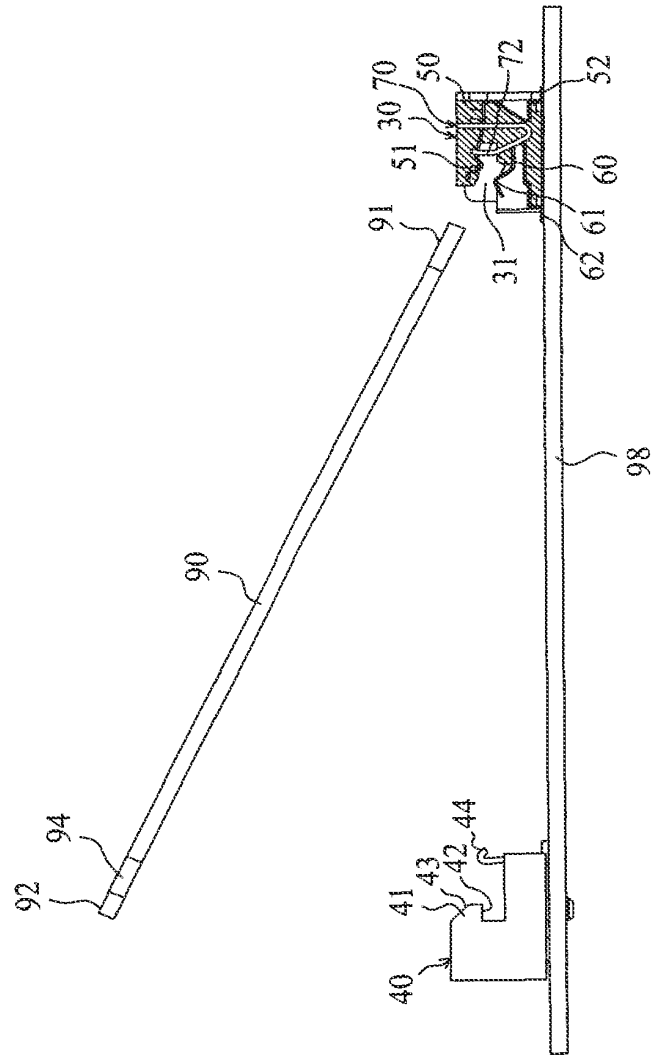


图 4

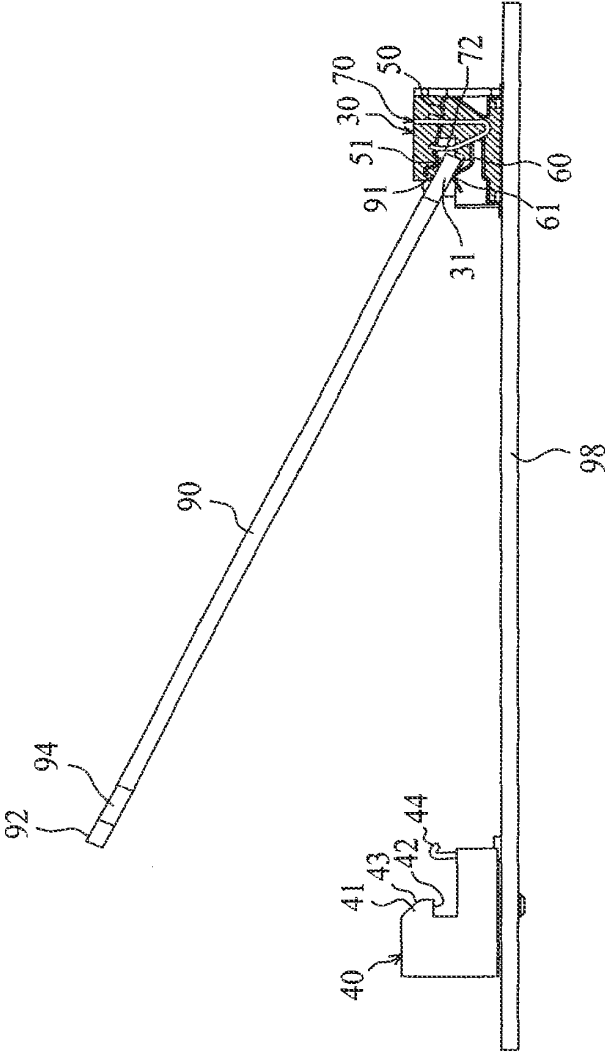


图 5

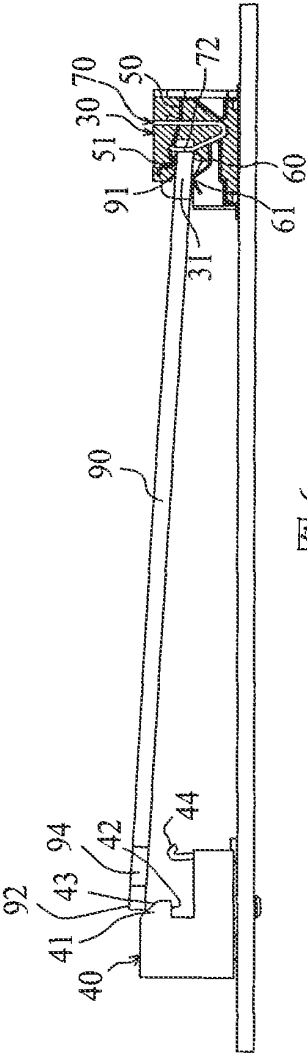


图 6

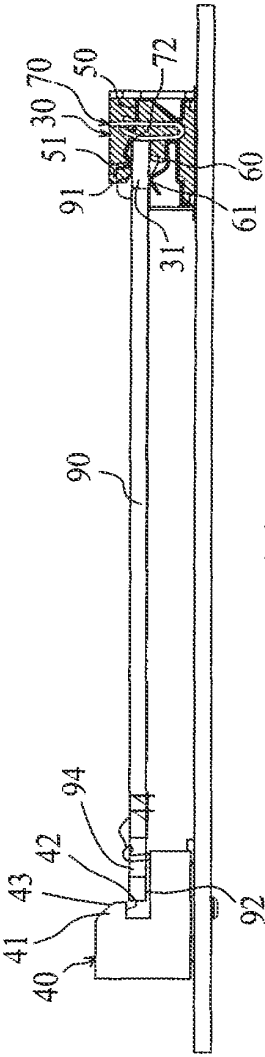


图 7

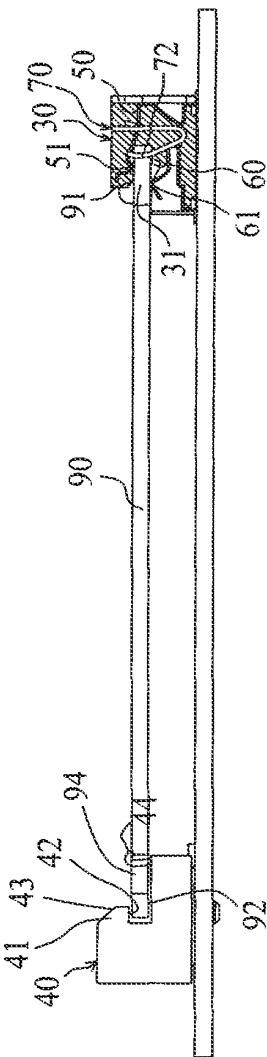


图 8

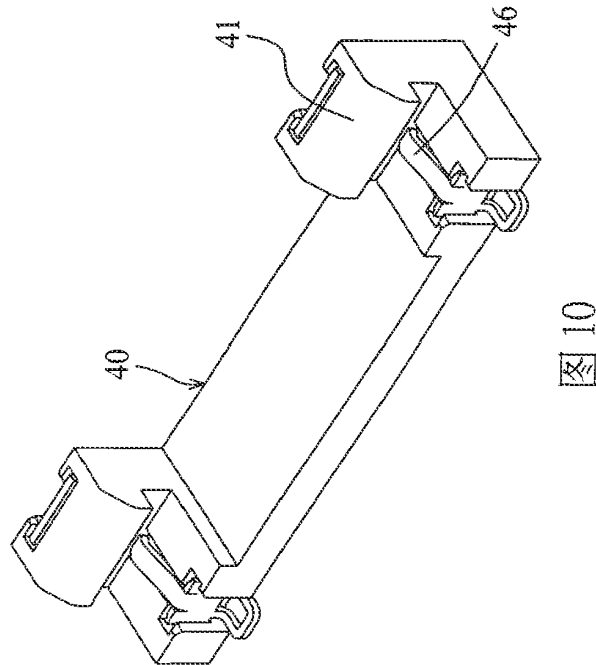


图 10

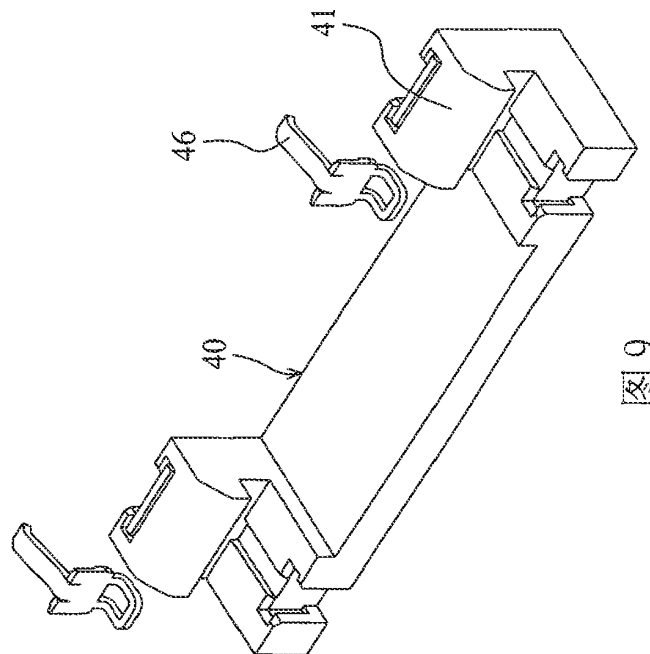
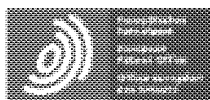


图 9



Espacenet

Bibliographic data: CN201332168 (Y) — 2009-10-21

Electrical connector with front metal shell

Inventor(s): ZHOUXIAN CAI [CN] ± (CAI ZHOUXIAN)**Applicant(s):** ZHOUXIAN CAI [CN] ± (CAI ZHOUXIAN)**Classification:** - **international:** *H01R13/42; H01R13/502*
- **cooperative:****Application number:** CN200820176227U 20081114**Priority number(s):** CN200820131580U 20080916 ; CN200820176227U 20081114**Abstract of CN201332168 (Y)**

The utility model relates to an electrical connector with a front metal shell. The electrical connector comprises a plastic base body, a plurality of terminal slots are formed at an inner row thereof, a through hole is respectively formed on at least one side; a plurality of terminals which are arranged in the terminal slots of the plastic base body; the front metal shell which is arranged at the front end of the plastic base body and provided with planes on two sides and a middle convex part, the through hole is respectively formed on the plane of at least one side; and at least one connecting plate element which is arranged on one side of the back surface of the plastic base body, a connecting plate part is arranged at the lower section thereof, a longitudinal card plate is arranged at the upper section thereof; a first card slot which is longitudinally extended is formed beside the through hole on the two sides of the back surface of the plastic base body, the card plate of the connecting plate element is clamped and fixed at the first card slot, and the card plate is corresponding to the through hole of the plastic base body. The connecting plate element is clamped and fixed on the back surface of the plastic base body from top to bottom, so as to achieve convenient assembly.

[19] 中华人民共和国国家知识产权局

[51] Int. Cl.

H01R 13/502 (2006.01)

H01R 13/42 (2006.01)



[12] 实用新型专利说明书

专利号 ZL 200820176227.1

[45] 授权公告日 2009 年 10 月 21 日

[11] 授权公告号 CN 201332168Y

[22] 申请日 2008.11.14

[21] 申请号 200820176227.1

[30] 优先权

[32] 2008.9.16 [33] CN [31] 200820131580.8

[73] 专利权人 蔡周贤

地址 中国台湾台北县

[72] 发明人 蔡周贤

[74] 专利代理机构 永新专利商标代理有限公司

代理人 李树明

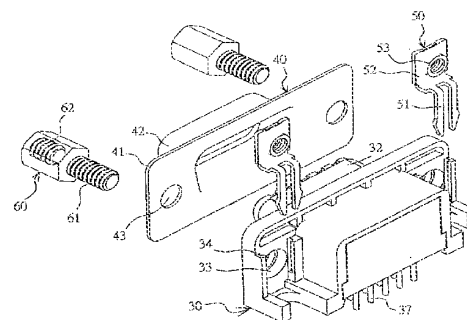
权利要求书 1 页 说明书 4 页 附图 5 页

[54] 实用新型名称

具有前金属壳的电连接器

[57] 摘要

一种具有前金属壳的电连接器，其包括有：一塑胶座体，其内排设有多个端子槽，其至少一侧各设有一穿孔；多个端子，其设于该塑胶座体的端子槽；一前金属壳，其是设于该塑胶座体的前端，其设有两侧的平面及一中间的凸部，其至少一侧的平面设有一穿孔；及至少一接板元件，其设于塑胶座体背面一侧，其下段设有一接板部，其上段设有一纵向的卡板；该塑胶座体背面两侧的穿孔旁设有纵向延伸的第一卡槽，该接板元件的卡板卡定于该第一卡槽，该卡板对应该塑胶座体的穿孔。本实用新型的接板元件由上而下卡定于塑胶座体背面，达到组装上的方便性。



1. 一种具有前金属壳的电连接器，其包括有：
 - 一塑胶座体，其内排设有多个端子槽，其至少一侧各设有一穿孔；
 - 多个端子，设于该塑胶座体的端子槽；
 - 一前金属壳，设于该塑胶座体的前端，其设有两侧的平面及一中间的凸部，其至少一侧的平面设有一穿孔；及
 - 至少一接板元件，其设于塑胶座体背面一侧，其下段设有一接板部，其上段设有一纵向的卡板；其特征在於：该塑胶座体背面两侧的穿孔旁设有纵向延伸的第一卡槽，该接板元件的卡板卡定于该第一卡槽，该卡板对应该塑胶座体的穿孔。
2. 如权利要求 1 所述的具有前金属壳的电连接器，其特征在於：该接板元件的卡板设有一穿孔对应该塑胶座体的穿孔。
3. 如权利要求 2 所述的具有前金属壳的电连接器，其特征在於：该接板元件的卡板的穿孔为一螺孔。
4. 如权利要求 1 所述的具有前金属壳的电连接器，其特征在於：该前金属壳的穿孔周缘设有至少一卡勾，该前金属壳的卡勾穿入该塑胶座体一侧的穿孔与塑胶座体卡定，该卡勾与该接板元件的卡板接触。
5. 如权利要求 4 所述的具有前金属壳的电连接器，其特征在於：该塑胶座体背面一侧的穿孔周缘设有至少一第二卡槽，该前金属壳的卡勾与该第二卡槽卡定。
6. 如权利要求 1 所述的具有前金属壳的电连接器，其特征在於：该接板元件的接板部为一弹性卡扣。

具有前金属壳的电连接器

【技术领域】

本实用新型是关于一种电连接器，特别是关于一种具有前金属壳的电连接器。

【背景技术】

请参阅图1及图2，为一种现有的具有前金属壳的电连接器，其包括有一塑胶座体10，其内排设有多个端子槽，其两侧各设有一穿孔12；多个端子14，其设于该塑胶座体10的端子槽，端子14的接脚伸出塑胶座体10外；一前金属壳15，其是设于该塑胶座体10的前端，其设有两侧的平面16及一中间的凸部17，该两侧的平面16各设有一穿孔18；二接板元件20，其是定位于该塑胶座体10的背面两侧，其下段设有一接板部21，其上段设有一定位板22，该定位板设有一穿孔23；二铆钉25，其设有一螺孔26及一卡面27，其是穿过该该接板元件20的穿孔23、塑胶座体10的穿孔12、及前金属壳15的穿孔18后铆合固定；二螺栓28，其后段有外螺纹锁于该铆钉25的螺孔26，其前段设有一螺孔29，该螺栓28的前端与前金属壳15的凸部17等高。

现有构造是借由一铆钉25将前金属壳15及接板元件20铆合固定该塑胶座体10，同时前金属壳15及接板元件20借由该铆钉25电气导通，达到接地效果，最后再锁上一螺栓28与前金属壳15的凸部17等高，如此在加工上较为费工，增加制造成本。

【实用新型内容】

本实用新型的主要目的在于提供一种具有前金属壳的电连接器，其接板元件由上而下卡定于塑胶座体背面，达到组装上的方便性。

为达上述目的，本实用新型具有前金属壳的电连接器包括有：一塑胶座

体，其内排设有多个端子槽，其两侧各设有一穿孔；多个端子，其设于该塑胶座体的端子槽；一前金属壳，其是设于该塑胶座体的前端，其设有两侧的平面及一中间的凸部，其至少一侧的平面设有一穿孔；及至少一接板元件，其设于塑胶座体背面二侧，其下段设有一接板部，其上段设有一纵向的卡板；其特征在于，该塑胶座体背面两侧的穿孔旁设有纵向延伸的第一卡槽，该接板元件的卡板卡定于该第一卡槽，该卡板对应该塑胶座体的穿孔。

本实用新型具有前金属壳的电连接器，该接板元件由上而下使板卡定于塑胶座体背面的第一卡槽，如此即使该接板元件很稳固的与塑胶座体定位，接着再将螺栓穿过前金属壳的穿孔及塑胶座体的穿孔螺锁于该接板元件的螺孔即可，组装上非常方便，不需再借由机器打铆钉，可降低制造成本。

本实用新型的上述及其他目的、优点和特色由以下较佳实施例的详细说明中并参考图式当可更加明白。

【附图说明】

- 图1 是现有具有前金属壳的电连接器的立体组合图。
- 图2 是现有具有前金属壳的电连接器的立体分解图。
- 图3 是本实用新型第一实施例的立体图。
- 图4 是本实用新型第一实施例的立体分解图。
- 图5 是本实用新型第二实施例的立体图。
- 图6 是本实用新型第二实施例的立体分解图。
- 图7 是本实用新型第三实施例的立体图。

塑胶座体 30	端子槽 31	凸部 32	穿孔 33	第一卡槽 34
第二卡槽 35	端子 37			
前金属壳 40	平面 41	凸部 42	穿孔 43	
卡勾 44	接板元件 50	接板部 51	卡板 52	
螺孔 53	延伸段 54			
螺栓 60	外螺纹 61	螺孔 62		

【具体实施方式】

请参阅图3及图4，为本实用新型第一实施例，其包括有：一塑胶座体30、多个端子37、一前金属壳40、二接板元件50、及二螺栓60，其中：

该塑胶座体30内排设有多个端子槽，其前端设有一凸部32，其两侧各设有一圆形的穿孔33，该穿孔33旁设有一纵向延伸的第一卡槽34。

该多个端子37设于该塑胶座体30的端子槽，各端子37的接脚伸出塑胶座体30外。

该前金属壳40设于该塑胶座体30的前端，其设有两侧的平面41及一中间的凸部42，其凸部42包覆该塑胶座体30的凸部32周边，其两侧平面41各设有一圆形的穿孔43。

该接板元件50是作为连接于一电路板上而形成接地，其下段设有一接板部51，该接板部51为一弹性卡扣，其上段设有一纵向的卡板52，该卡板52中间设有一螺孔53，该卡板52卡定于该塑胶座体30的第一卡槽34时，该螺孔53对应该塑胶座体的穿孔33。

该螺栓60的后段设有外螺纹61且前段设有一螺孔62，其后段穿过前金属壳40的穿孔43及塑胶座体30的穿孔33螺锁于该接板元件50的螺孔53，借此将前金属壳40定位且与接板元件50电气导通。

在组装上，该接板元件50由上而下使板52卡定于塑胶座体30背面的第一卡槽34，如此即使该接板元件50很稳固的与塑胶座体30定位，接着再将螺栓60穿过前金属壳40的穿孔43及塑胶座体30的穿孔33螺锁于该接板元件50的螺孔53即可，组装上非常方便，不需再借由机器打铆钉，可降低制造成本。

请参阅图5图6，为本实用新型的第二实施例，其大致与第一实施例相同，其包括有：一塑胶座体30、多个端子37、一前金属壳40、及二接板元件50，其中：

该塑胶座体30为一架高型式，其内排设有多个端子槽，其前端设有一凸部32，其两侧各设有一圆形的穿孔33，该穿孔33二侧设有一纵向延伸的第一卡槽34且上、下端各设有一第二卡槽35。

该多个端子 37 设于该塑胶座体 30 的端子槽，各端子 37 的接脚伸出塑胶座体 30 外。

该前金属壳 40 设于该塑胶座体 30 的前端，其设有两侧的平面 41 及一中间的凸部 42，其凸部 42 包覆该塑胶座体 30 的凸部 32 周边，其两侧平面 41 各设有一圆形的穿孔 43，该穿孔 43 周缘设有二对称的卡勾 44，该卡勾 44 穿入该塑胶座体一侧的穿孔 33 与第二卡槽 35 卡定且稍微凸出塑胶座体背面。

该接板元件 50 的下段设有一接板部 51，其上段设有一纵向的卡板 52，该卡板 52 中间设有一螺孔 53，其中段为倒 L 形的延伸段 54，该卡板 52 卡定于该塑胶座体 30 的第一卡槽 34 时，该螺孔 53 对应该塑胶座体的穿孔 33 且该卡板 52 与前金属壳 40 的卡勾 44 接触。

本实施例的接板元件 50 与前金属壳 40 的卡勾 44 接触，故该接板元件 50 的螺孔 53 虽没有锁上一螺栓，该接板元件 50 与前金属壳 40 即已电气导通，故可适用螺孔较低者或是不需锁者，当然若要使螺孔与前金属壳 40 的凸部等高，只需再锁上二螺栓即可。

请参阅图 7，为本实用新型第三实施例，其大致与第一实施例相同，其差异在于本实施例的接板元件 50 的接板部 51 呈一水平板，各端子 37 伸出塑胶座体 30 外的接脚呈水平，另外该塑胶座体 30 的底部设有数个卡柱 39。

上述的三种实施例的螺孔是选择设在接板元件，然而亦可选择螺孔设在该前金属壳，即该前金属壳两侧的穿孔设成螺孔。

上述的三种实施例皆为母座型态的电连接器，即该塑胶座体前端设有一凸部者，各端子为母端子型态排列设于该凸部内，然而若是公座型态的电连接器同样可以应用本实用新型实施，公座型态的电连接器的塑胶座体前端未设有一凸部者，而各端子为公端子型态具有一针状的接触端凸出塑胶座体前端。

在较佳实施例的详细说明中所提出的具体的实施例仅为了易于说明本实用新型的技术内容，而并非将本实用新型狭义地限制于该实施例，在不超出本实用新型的精神及申请专利范围的情况，可作种种变化实施。

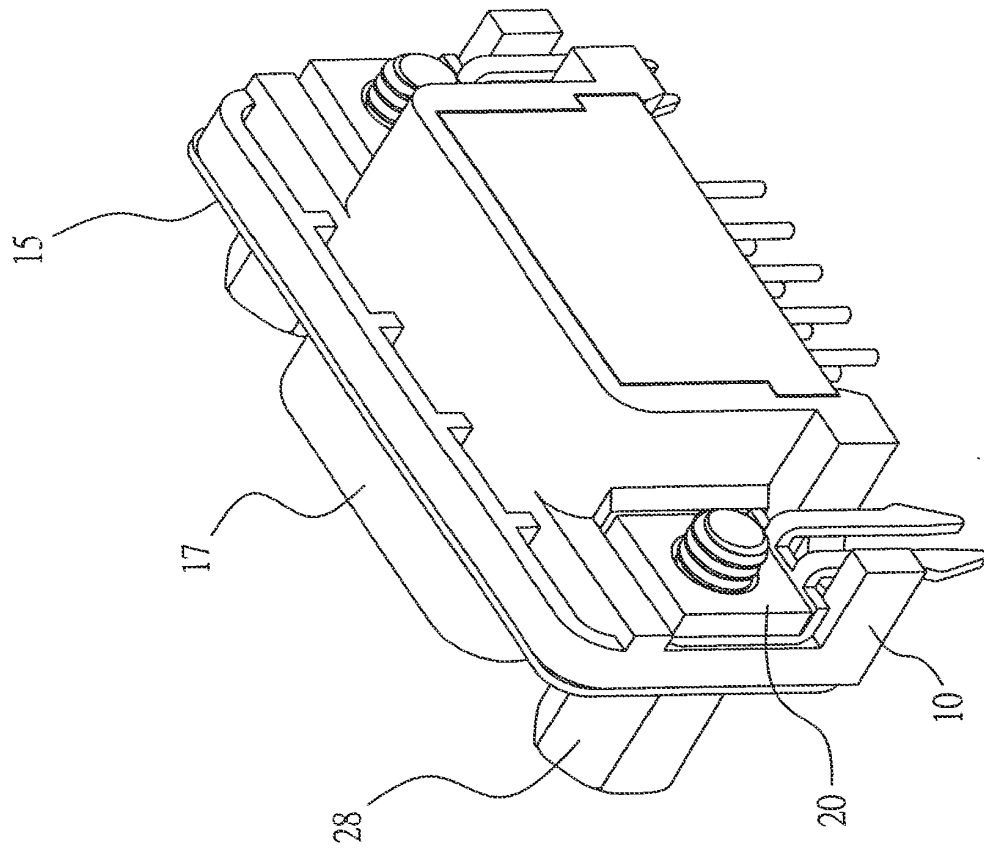


图 1

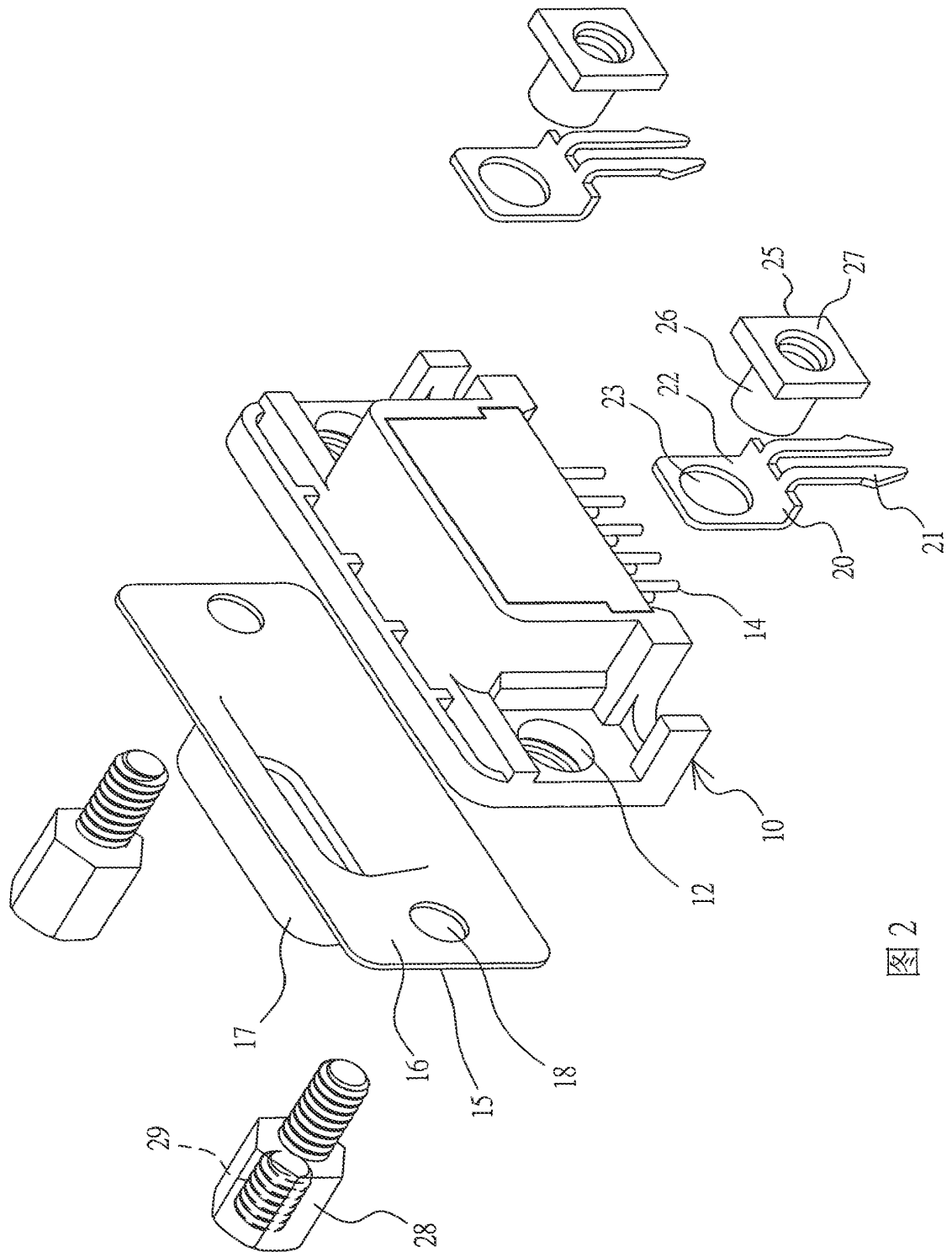


图 2

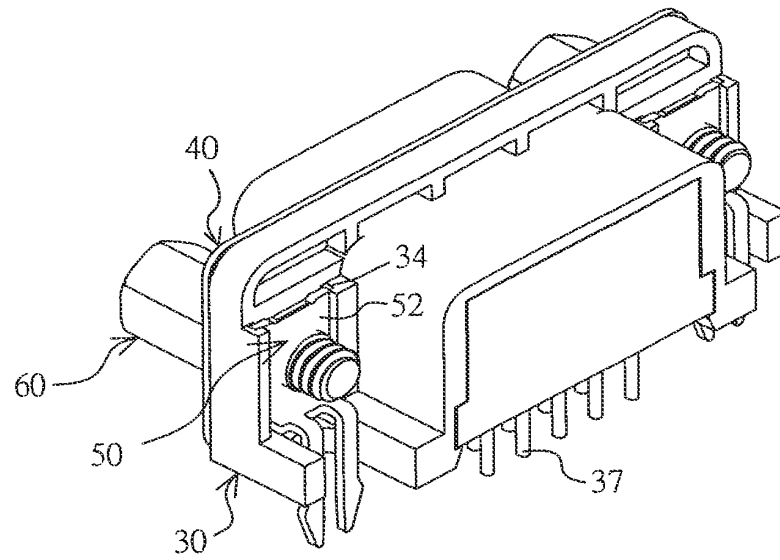


图 3

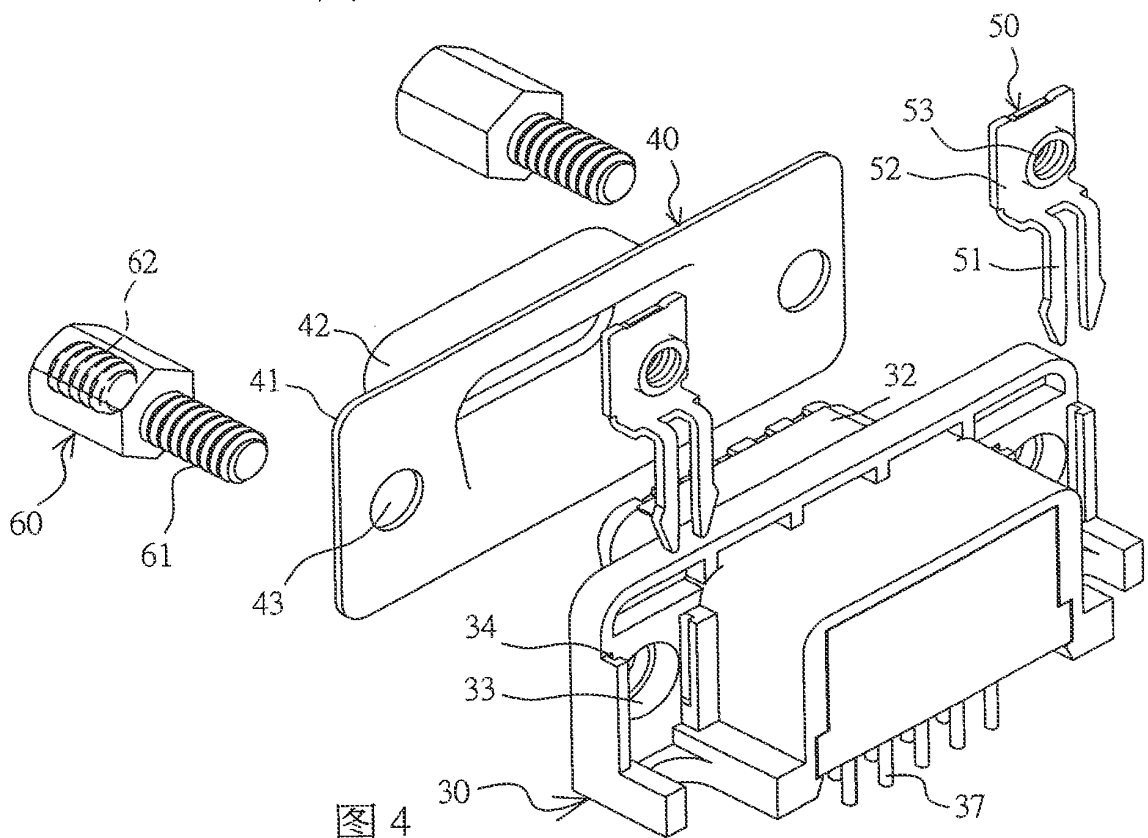


图 4

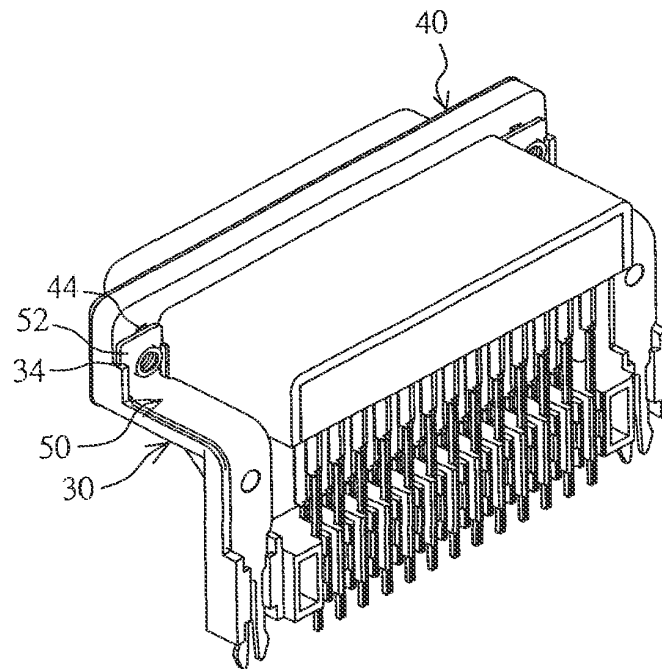


图 5

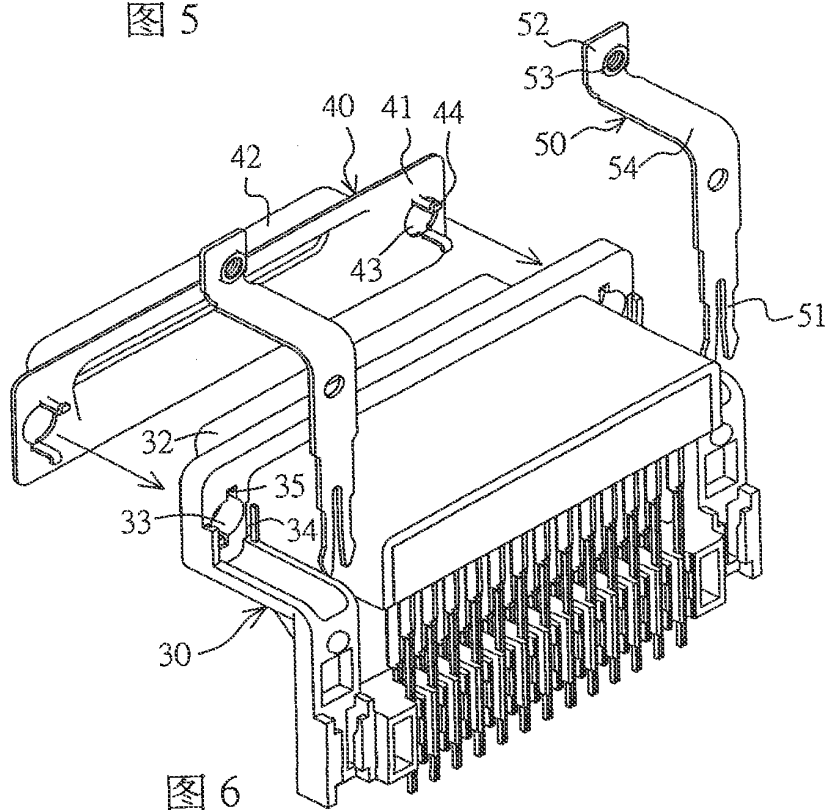


图 6

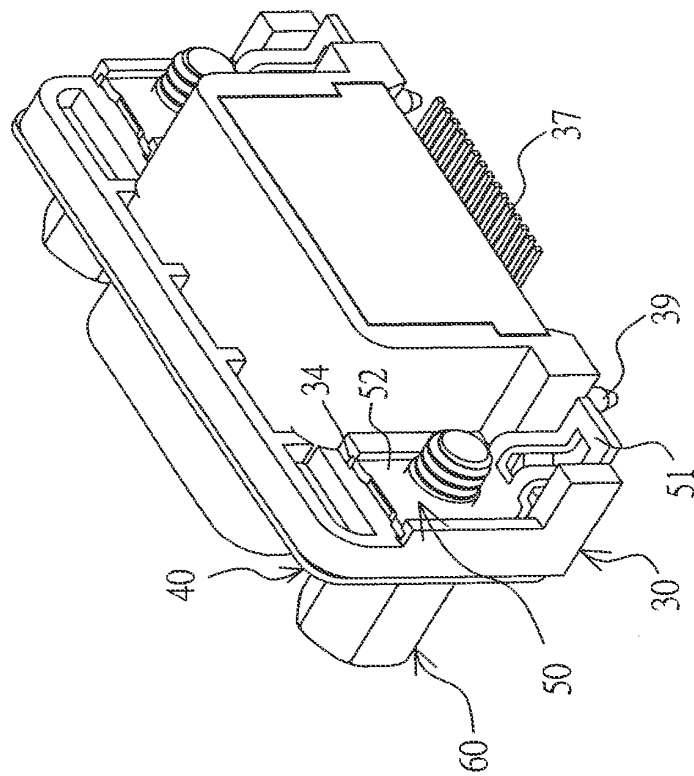
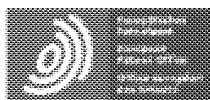


图7



Espacenet

Bibliographic data: CN201378641 (Y) — 2010-01-06**USB interface socket with double plug-in surfaces****Inventor(s):** JIANQIANG REN ± (REN JIANQIANG)**Applicant(s):** BEIJING HUAQI INF DIGITAL SCI ± (BEIJING HUAQI INFORMATION DIGITAL TECHNOLOGY CO.,LTD)**Classification:** - **international:** *H01R13/40; H01R13/46; H01R13/64*
- **cooperative:****Application number:** CN200920105765U 20090306**Priority number(s):** CN200920105765U 20090306**Abstract of CN201378641 (Y)**

The utility model provides a USB interface socket with double plug-in surfaces, which comprises a connection main body, a shielding shell and conductive terminals assembled on the connection main body. The shielding shell is coated on the connection main body to form an accommodation space; the middle part of the connection main body extends forwards to form a supporting body; the supporting body divides the accommodation space of the shielding shell into upper and lower accommodation spaces; the conductive terminals are respectively correspondingly assembled on upper and lower end surfaces of the supporting body. The utility model arranges the conductive terminals on the upper and lower end surfaces of the supporting body of the socket, so that when being inserted into the socket in positive or negative direction, the USB plug can be electrically connected with the conductive terminals so as to conveniently process data transmission of the USB standard protocol and avoid the trouble that when the user inserts the USB plug in negative direction, the USB plug needs to be connected again. Thereby, the utility model has convenient use.

[19] 中华人民共和国国家知识产权局



[12] 实用新型专利说明书

专利号 ZL 200920105765.6

[51] Int. Cl.

H01R 12/14 (2006.01)

H01R 13/40 (2006.01)

H01R 13/46 (2006.01)

H01R 13/64 (2006.01)

[45] 授权公告日 2010 年 1 月 6 日

[11] 授权公告号 CN 201378641Y

[22] 申请日 2009.3.6

[21] 申请号 200920105765.6

[73] 专利权人 北京华旗资讯数码科技有限公司

地址 100080 北京市海淀区北四环西路 58 号
理想国际大厦 11 层

[72] 发明人 任建强

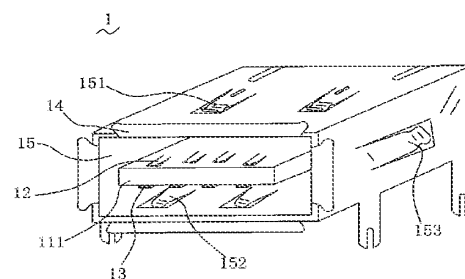
权利要求书 3 页 说明书 9 页 附图 5 页

[54] 实用新型名称

双插接面的 USB 界面插座

[57] 摘要

本实用新型提供一种双插接面的 USB 界面插座，包括连接本体、屏蔽壳体以及组装于连接本体上的导电端子，所述的屏蔽壳体包覆于连接本体形成容纳空间，所述的连接本体的中部向前伸出形成承载体，所述的承载体将屏蔽壳体的容纳空间区分为上、下容纳空间，所述的导电端子分别对应组装于所述承载体的上、下端面。本实用新型通过将插座的承载体的上、下端面均设置导电端子，方便 USB 插头正、反方向插入时，均可以与导电端子电气连接而进行 USB 标准协议的数据传输，避免使用者反向插入 USB 插头而需重新连接的繁琐，方便使用。



1、一种双插接面的 USB 界面插座，包括连接本体、屏蔽壳体以及组装于连接本体上的导电端子，所述的屏蔽壳体包覆于连接本体形成容纳空间，其特征在于，所述的连接本体的中部向前伸出形成承载体，所述的承载体将屏蔽壳体的容纳空间区分为上、下容纳空间，所述的导电端子分别对应组装于所述承载体的上、下端面。

2、根据权利要求 1 所述的双插接面的 USB 界面插座，其中，所述的承载体的上端面与下端面之间的高度与标准 USB 插座的连接本体的高度相等。

3、根据权利要求 1 所述的双插接面的 USB 界面插座，其中，所述的承载体的上端面与下端面之间的高度小于标准 USB 插座的连接本体的高度。

4、根据权利要求 1 所述的双插接面的 USB 界面插座，其中，所述的承载体的上、下端面分别与上、下端面的导电端子的端面齐平。

5、根据权利要求 1 所述的双插接面的 USB 界面插座，其中，所述的承载体的上、下端面高于位于上、下端面的导电端子的端面。

6、根据权利要求 4 或 5 所述的双插接面的 USB 插座，其中，所述的承载体的下端面与上端面的导电端子的顶端面之间的高度等于

或小于标准 USB 插头的连接端子与金属壳体的上端内壁之间的高度。

7、根据权利要求 4 或 5 所述的双插接面的 USB 插座，其中，所述的承载体的上端面与下端面的导电端子的顶端面之间的高度等于或小于标准 USB 插头的连接端子的与金属壳体的上端内壁之间的高度。

8、根据权利要求 1 所述的双插接面的 USB 界面插座，其中，所述的组装于承载体的上、下端面的导电端子分别插设位于所述的承载面的上、下端面之上。

9、根据权利要求 8 所述的双插接面的 USB 界面插座，其中，所述的承载体的下端面的导电端子的端面与上端面的导电端子的顶端面之间的高度等于或小于标准 USB 插头的连接端子与金属壳体的上端内壁之间的高度。

10、根据权利要求 8 所述的双插接面的 USB 界面插座，其中，所述的承载体的上端面的导电端子的端面与下端面的导电端子的顶端面之间的高度等于或小于标准 USB 插头的连接端子与金属壳体的上端内壁之间的高度。

11、根据权利要求 1 所述的双插接面的 USB 界面插座，其中，所述的承载体的上端面的导电端子的电气规格从左至右的排列顺序与下端面的导电端子的电气规格从右至左的排列顺序相同。

12、根据权利要求 11 所述的双插接面的 USB 界面插座，其中，所述的载体包括四层印刷电路板，每层印刷电路板布设连接线路，所述的四层印刷电路板叠置合成后，每层印刷电路板的连接线路以过孔电气连接并分别连接上、下端面的导电端子后对应连接至 USB 讯号线。

13、根据权利要求 11 所述的双插接面的 USB 界面插座，其中，所述的承载体的上、下端面的导电端子通过连接导线对应连接至 USB 讯号线。

双插接面的 USB 界面插座

【所属技术领域】

本实用新型涉及一种插座连接器，尤其涉及具有双插接面，且双面插接面均为 USB 标准的 USB 界面插座，方便 USB 插头正反向插入时均可连接使用。

【背景技术】

USB 连接界面已经成为当前电子产品，如计算机、数码相机、MP3 播放器等的必备连接界面，上述的电子产品多设置有 USB 插座连接器的接口。

如图 1 及图 2，现有技术的 USB 插座 100 是与 USB 插头 200 对应插接使用，需要使用者辨认 USB 插头 200 插入的正确方向，即，USB 插头 200 的舌板 210 上的端子 230 才能插入 USB 插座 100 内并与插座本体 110 的下端面的插座端子 120 弹性接触，才能实现 USB 插头 200 与 USB 插座 100 的电连接。如图 3 及图 4 所示，若 USB 插头 200 插入方向错误时，由于 USB 插座 100 的插座本体 110 与金属壳体 130 的上端内壁之间的高度远小于 USB 插头 200 的舌板与连接端子 230 的高度之和，故，USB 插头不能插入 USB 插座 100 使用，需要使用者再次以正确方向插入才能使用。因此，现有技术的 USB 插座 100 导致使用者每次使用时，均需要使用者辨认并保证 USB 插头 200 的正确插入方向才能与 USB 插座 100 插接，使用极不方便。

此外，当不熟悉电子产品的人，如老人或孩子，又或者，当 USB 连接口的位置不方便时，例如 USB 插座的连接口位于计算机的机箱后面板位置时，若 USB 插头插入方向错误而需要再次重新正确插入时，则徒然增加使用的繁琐，带来使用者的极大不方便。

因此，针对现有技术的 USB 插座的上述技术问题，迫切需要一种方便 USB 插头插入的 USB 插座，无需区分 USB 插头的正反方向，避免 USB 插头插入方向插入错误时还需要再次插入的繁琐操作。

【实用新型内容】

本实用新型提供一种双插接面的 USB 界面插座，方便 USB 插头以正反方向插入时均可以正常使用。

为解决上述实用新型的技术问题，本实用新型提供一种基于 USB 连接界面的双插接面的插座连接器，包括连接本体、屏蔽壳体以及组装于连接本体上的导电端子，所述的屏蔽壳体包覆于连接本体形成容纳空间，所述的连接本体的中部向前伸出形成承载体，所述的承载体将屏蔽壳体的容纳空间区分为上、下容纳空间，所述的导电端子分别对应组装于所述承载体的上、下端面。

由上述可知，本实用新型通过将插座的承载体的上、下端面均设置导电端子，从而方便 USB 插头正、反方向插入时，均可以与导电端子电气连接而进行 USB 标准协议的数据传输，避免使用者反向插入 USB 插头而需重新连接的繁琐，减少使 USB 插头插接使用的重复性，方便使用。

【附图说明】

图 1 是现有技术的 USB 插座连接器的立体图。

图 2 是现有技术的 USB 插头连接器的立体图。

图 3 是图 1 的 USB 插座连接器的正面视图。

图 4 是图 2 的 USB 插头连接器的正面视图。

图 5 是本实用新型具有双插接面的 USB 界面插座的立体图。

图 6 是图 5 的插座的正面视图。

图 7 是本实用新型具有双插接面的 USB 界面插座的第一实施例的剖视图。

图 8 是本实用新型具有双插接面的 USB 界面插座的第二实施例的剖视图。

图 9 是本实用新型具有双插接面的 USB 界面插座的电路连接图。

【具体实施方式】

为进一步阐述本实用新型达成预定目的所采取的技术手段及功效,以下结合附图及实施例,对本实用新型具有双插接面的 USB 界面插座的具体实施方式、结构特征及其功效,详细说明如下。

请参阅图 5、图 6、图 7 及图 8,本实用新型具有双插接面的 USB 界面插座 1 包括连接本体 11,连接本体 11 的中部向前伸出一体形成承载体 111。承载体 111 的上、下端面分别设置导电端子 12、13。屏蔽壳体 14 包覆于连接本体 11 的外部并围成容纳空间 15,承载体 111

将屏蔽壳体围成的容纳空间区分为上、下容纳空间。为便于叙述简洁，以下描述提及本实用新型具有双插接面的 USB 插座 1 均简称 USB 界面插座。USB 界面插座 1 的屏蔽壳体 14 的上、下端壁及左、右侧壁上分别设置弹片 141，以与 USB 插头 200 卡扣以稳定连接。

如图 6 所示，USB 界面插座 1 的承载体 111 的上端面的导电端子 12 包括从左到右的接地端子 12a、数据端子 12b、12c 和电源端子 12d，承载体 111 的下端面的导电端子 13 包括从右到左的接地端子 13a、数据端子 13b、13c 和电源端子 13d。USB 插头 200 正向插入 USB 界面插座 1 时，USB 插头 200 的连接端子 230a、230b、230c、230d 分别与承载体 111 的下端面的导电端子 13a、13b、13c 及 13d 接触导通并正确的电性连接，而若 USB 插头 200 反向插入时，即插头 200 的连接端子 230a、230b、230c、230d 竖直朝下插入，则连接端子 230a、230b、230c、230d 分别与承载体 111 的上端面的导电端子 12a、12b、12c 和 12d 接触而电性连接。

如上所述，当 USB 插头 200 的反向插入时，USB 插头 200 的连接端子从左到右为 230d、230c、230b、230a 呈反向顺序排列，从左到右变为 230a、230b、230c、230d，为配合 USB 插头 200 的反向插入时能实现正确地与 USB 界面插座 1 的承载体 111 的上端面的导电端子 12 电性连接以传输数据，则承载体 111 上端面的导电端子 12a、12b、12c、12d 从左到右的排列顺序是与下端面的导电端子 13a、13b、13c、13d 从左到右的排列顺序呈反向排列。

如图 7，是 USB 界面插座 1 的第一实施例的侧面的剖视图。承

载体 111 的上、下端面分别开设端子槽 16、17，导电端子 12、13 分别插设于端子槽 16、17 内，导电端子 12、13 的接触部 121、131 呈拱形弹性突出于端子槽 16、17 并高于上、下端面。当 USB 插头 200 的连接端子 230 分别与导电端子 12、13 的接触部 121、131 接触实现电性连接时，接触部 121、131 承受弹性压力而向下回缩，进而使得接触部 121、131 的顶端面分别低于载体 111 的上、下端面，或者，使得接触部 121、131 的顶端面与载体 111 的上、下端面齐平。因此，载体 111 的上、下端面之间的高度 $H5$ 大于或等于上、下端面的导电端子 12、13 的顶端面之间的高度 $H6$ 。

在本第一实施例中，载体 111 的下端面与上端面的导电端子 12 的接触部 121 的顶端面之间的高度 $H7$ 小于 USB 插头 200 的连接端子 230 的顶端面与金属壳体 220 的上端内壁之间的高度 $H4$ ，载体 111 的上端面与下端面上的导电端子 13 的接触部 131 的顶端面之间的高度 $H8$ 小于 USB 插头 200 的连接端子 230 的顶端面与金属壳体 220 的上端内壁之间的高度 $H4$ 。因此，即使 USB 插头 200 反向插入 USB 界面插座 1 后，USB 插头 200 的连接端子 230 与载体 111 的上端面的导电端子 12 实现正确的电接触而实现电性连接，并使得载体 111 的下端面的导电端子 13 不与 USB 插头 200 的金属壳体 230 接触，进而避免电路短路。

同理，在 USB 插头正确插入 USB 兼容插座 1 后，USB 插头 200 的连接端子 230 与导电端子 13 进行电性连接时，也避免载体 111 的上端面的导电端子 12 与金属壳体 220 接触而短路。

如图 8, 为 USB 界面插座 1 的第二实施例的侧面剖视图。与第一实施例不同之处在于, 导电端子 12'、13' 位于承载体 111' 的上、下端面上, 导电端子 12'、13' 的后端嵌插于连接本体 11' 内部并固定。因此, 承载体 111' 的上、下端面的高度 H9 增加了导电端子 12'、13' 的前端的接触部 121'、131' 的高度, 承载体 111' 的上、下端面的导电端子 12'、13' 的顶端面之间的高度 H10 大于承载体 111' 的上、下顶端面之间的高度 H9。

在第二实施例中, 承载体 111' 的上端面的导电端子 12' 的接触部 121' 的端面与下端面的导电端子 13' 的接触部 131' 的顶端面之间的高度 H11 小于 USB 插头 200 的连接端子 230 的顶端面与金属壳体 220 的上端内壁之间的高度 H4; 下端面的导电端子 13' 的接触部 131' 的端面与上端面的导电端子 12' 的接触部 121' 顶端面之间的高度 H12 小于 USB 插头 200 的连接端子 230 的顶端面与金属壳体 220 的上端内壁之间的高度 H4。因此, 当 USB 插头 200 反向插入 USB 界面插座 1' 时, 则 USB 插头 200 的连接端子 230 与导电端子 12' 的接触部 121'、131' 接触并抵压接触部 121'、131' 向下回缩至导电端子 12' 自身的厚度, 由于位于承载体 111' 上端面的导电端子 12' 的端面与下端面的导电端子 13' 的接触部 131' 的顶端面之间的高度 H11 小于 USB 插头 200 的舌板 210 的连接端子 230 的顶端面与金属壳体 220 之间的高度 H4, 故, USB 插头 200 的金属壳体 220 的上端内壁不与承载体 111' 的下端面的导电端子 13' 的接触部 131' 的顶端面接触, 从而避免导电端子 13' 与金属壳体 220 电性接触而短

路。

同理，若 USB 插头 200 正向插入 USB 界面插座 1' 时，导电端子 13' 与连接端子 230 电性接触时，同样避免载体 111' 的上端面的导电端子 12' 的接触部的顶端面与金属壳体 220 的上端内部接触而短路。

如上所述，本实用新型 USB 界面插座 1 的载体 11 的上、下端面分别设置导电端子，下端面的导电端子的端面与上端面的导电端子的接触部的顶端面之间的高度小于 USB 插头 200 的舌板 210 上的连接端子 230 的顶端面与金属壳体 220 的上端内壁之间的高度，进而，使得 USB 插头 200 不论正反向插入均可电性连接导电端子而实现数据传输，防止现有技术中使用者错误插入 USB 插头 200 而需要重新插入的繁琐操作的情况，且确保载体上的导电端子不与金属壳体的内壁接触而短路。

本实用新型 USB 界面插座 1 的载体 111 的上、下端面的导电端子 12、13 的排列顺序呈反向，为方便上下端面的导电端子的电气规格均符合 USB 标准协议，并均可连接至同一 USB 讯号连接线，在具体实施例中，可以采用四层电路板的电路实现载体 111 的上、下端面的导电端子 12、13 的电路连接之后再与 USB 讯号线连接。

如图 9，导电端子 12、13 之间的电路连接的四层印刷电路板 31、32、33、34，位于最外侧的第一、四层线路 31、34 分别作为接地片（GND）与电源片（VCC）。需要说明的是，图 9 中，第一、第四层 31、34 的电路布线为正片处理（即空白区具有导电材质），且第一线

路 31 所标示的双圆形点代表绝缘孔。反之，第二、三层 32、33 均为负片处理（即空白区域具有导电材质），其上空心圆点标示处表示与导电材质电连接的导孔，而实心圆点表示绝缘孔，故第二层线路 32 大部分面积均为接地，第三层线路 33 大多数面积即为电源。

第一、二、三及四层印刷电路 31-34 之间的电路之间的电性连接的具体方式，第一层线路 31 的接地连接利用导电接点 G 的两接触区域 b1、b2 对应连接至第二层线路 42 的导电孔 b1'、b2'，而其电源连接以导电接点 V 的接触区域 c1 对应连接至第三层线路 33 的导电孔 c1'。

第四层线路 44 的接地连接利用导电接点 G 的两接触区域 b3、b4 对应连接至第二层线路 42 的导电孔 b3'、b4'，而其电源连接以导电接点 V 的接触区域 C2、C3 对应连接至第三层线路 43 的导电孔 c2' c3'。

通过上述四层线路的相互连接，形成承接体的正、反两面具有 USB 标准协议的导电端子，如图 5 所示，为本实用新型的正、反面的立体图。图 6 为图 5 的正面视图，承载体的上端面的导电端子的排列顺序从右到左是 V（电源）、D1（第一数据接脚）、D2（第二数据接脚）及 G（接地），下端面的导电端子的排列顺序从右到左是 G（接地）、D2（第二数据接脚）、D1（第一数据接脚）以及 V（电源），因此，即使在 USB 插头 200 反向插入时，连接端子 230 与承载体的上端面的导电端子也能实现正确的电气接触而传输 USB 标准协议的数据。

综上所述，本实用新型双插接面的 USB 界面插座，通过在载体 111 的上、下端两面均设置导电端子 12、13，并通过电路连接使得 USB 插头 200 不论是正反方向插入本实用新型的 USB 界面插座 1 而均能正确地与上、下端面的导电端子 12、13 实现正确的电性连接，进而实现 USB 协议标准的数据通信，使用者无需分辨 USB 插头 200 的插入方向即可插入使用，简化使用者的操作和即时性使用，避免了现有技术的 USB 插头 200 插入错误而不能使用以及操作的繁琐。此外，本实用新型 USB 界面插座的结构简单，制造简单，适于工业批量生产及推广应用。

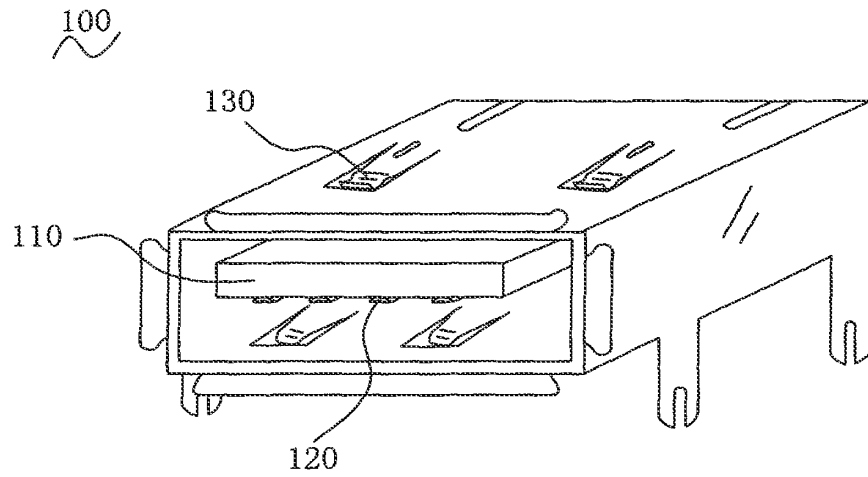


图 1

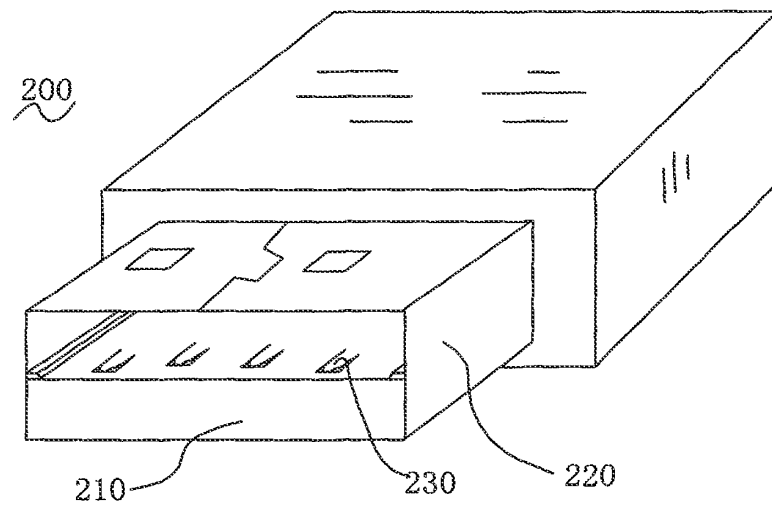


图 2

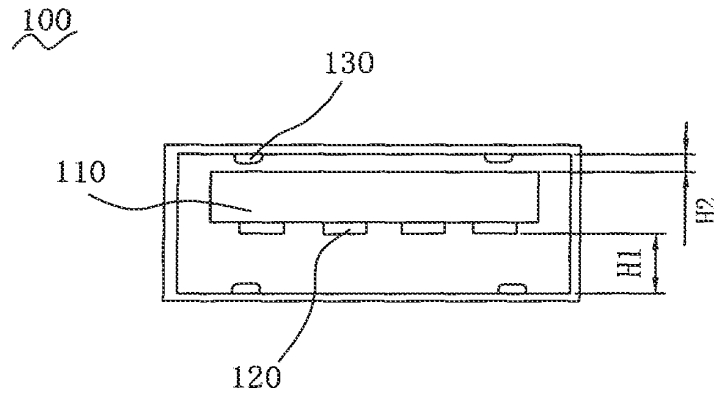


图 3

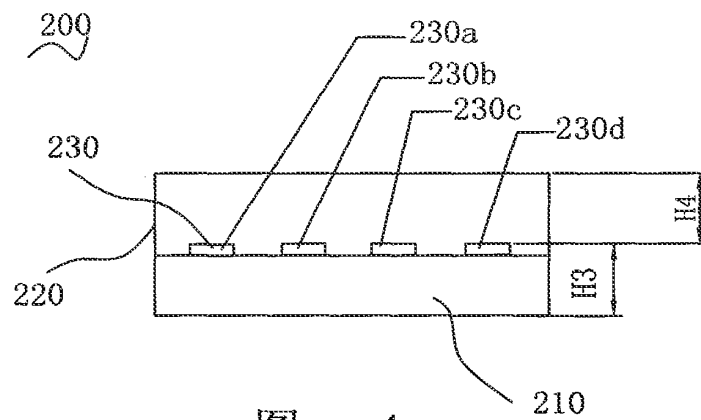


图 4

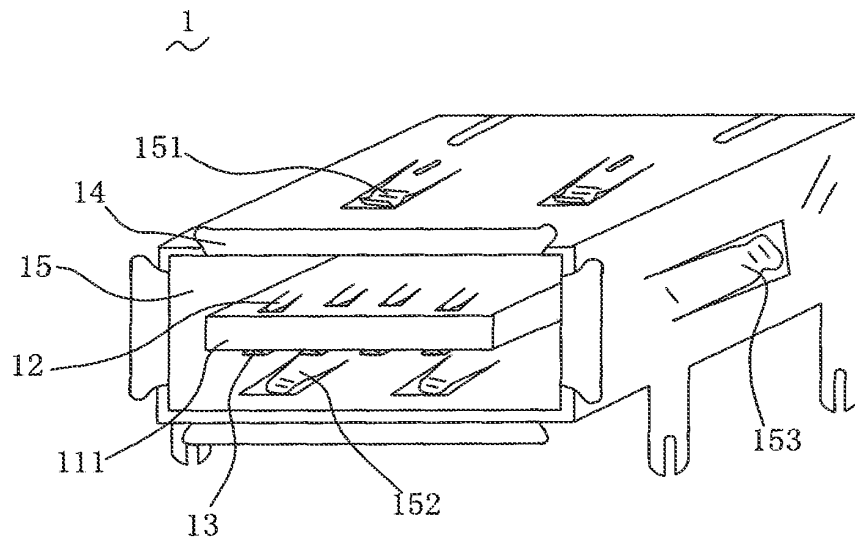


图 5

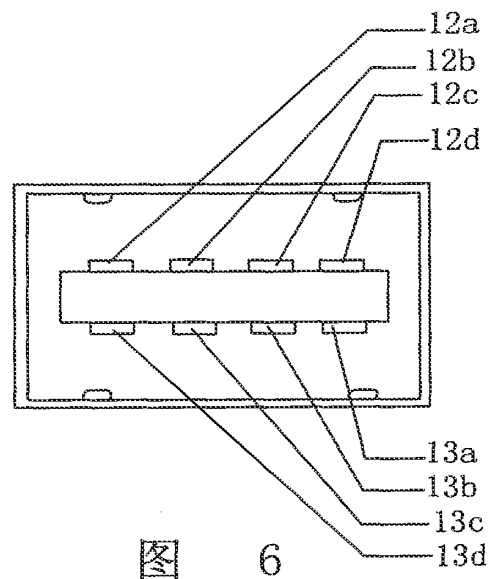


图 6

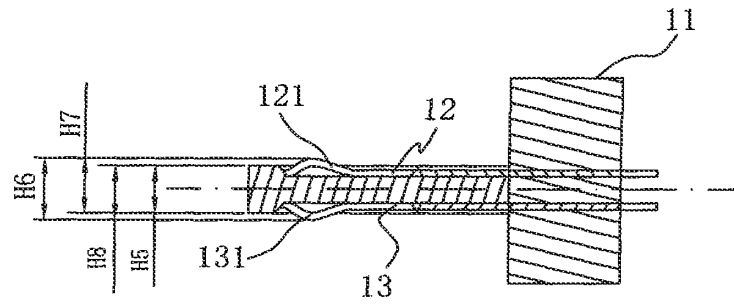


图 7

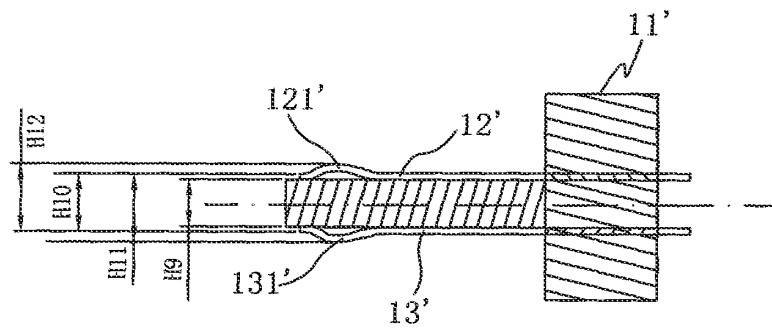


图 8

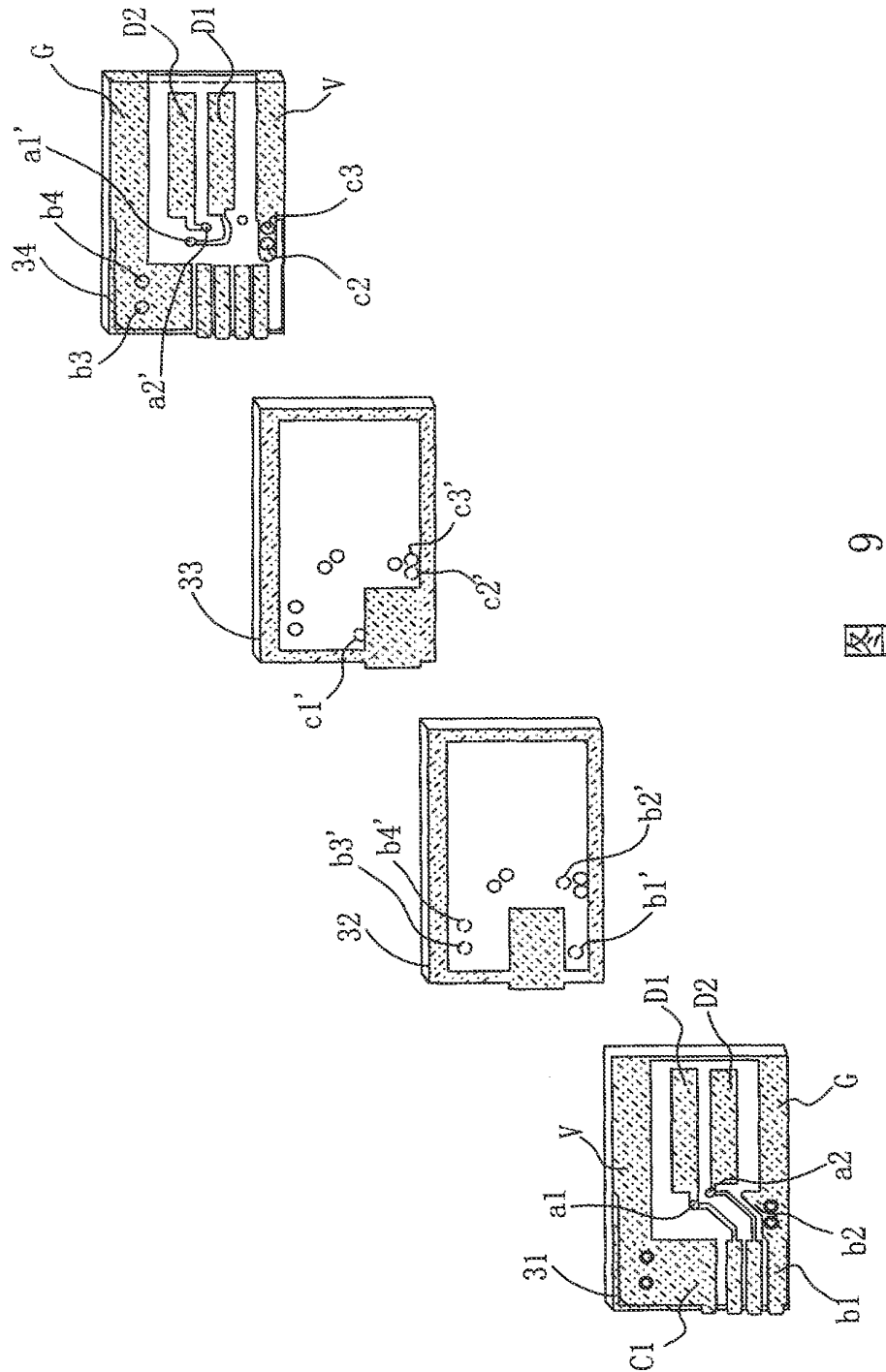
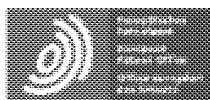


图 9



Espacenet

Bibliographic data: CN101728722 (A) — 2010-06-09

Electric connector with front metal shell

Inventor(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)
Applicant(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)
Classification: - **international:** *H01R13/506; H01R13/652*
- **cooperative:**
Application number: CN200810170033 20081015
Priority number(s): CN200810170033 20081015

Abstract of CN101728722 (A)

An electric connector with a front metal shell comprises a plastic seat body, a plurality of terminals, the front metal shell and two connecting plate elements, wherein the plurality of terminals are arranged in the plastic seat body, the front metal shell is arranged at the front end of the plastic seat body and is provided with planes around and a middle protrusion, the planes at two sides of the front metal shell are connected with at least one fixed plate respectively, and the fixed plate is extended to the back of the plastic seat body and the tail end of the fixed plate is provided with a clamping hook; the lower section of the connecting plate element is provided with a connecting plate part, and the upper section of the connecting plate element is provided with a longitudinal clamping plate; and the clamping plates are propped to the backs of the two sides of the plastic seat body and are clamped with the clamping hooks of the fixed plate of the front metal shell. Therefore, the assembly of the electric connector means simple buckling between the connecting plate elements and the fixed plate of the front metal shell which can be firmly combined to the plastic seat body and are contacted in electric conduction, so the front metal shell forms a grounding effect and does not need machining by means of driving a rivet, and the manufacturing cost can be obviously reduced.



(12) 发明专利申请

(10) 申请公布号 CN 101728722 A

(43) 申请公布日 2010.06.09

(21) 申请号 200810170033.5

(22) 申请日 2008.10.15

(71) 申请人 蔡周贤

地址 中国台湾台北县

(72) 发明人 蔡周贤

(74) 专利代理机构 永新专利商标代理有限公司
72002

代理人 李树明

(51) Int. Cl.

H01R 13/652 (2006.01)

H01R 13/506 (2006.01)

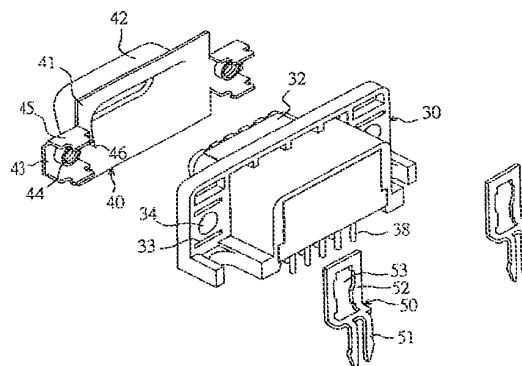
权利要求书 1 页 说明书 4 页 附图 7 页

(54) 发明名称

具有前金属壳的电连接器

(57) 摘要

一种具有前金属壳的电连接器,其包括有:一塑胶座体;多个端子,其设于该塑胶座体;一前金属壳,其是设于该塑胶座体的前端,其设有周边的平面及一中间的凸部,其两侧的平面各连接至少一固定板,该固定板延伸至该塑胶座体背面且末端设有一卡勾;及二接板元件,其下段设有一接板部,其上段设有纵向的卡板;该卡板抵于塑胶座体两侧背面且与该前金属壳的固定板的卡勾卡定。借由以上说明,可知本发明在组装上仅是接板元件与前金属壳的固定板作简单的卡扣,两者即可稳固结合于该塑胶座体,且两者接触电气导通,使前金属壳形成接地效果,不需借由打铆钉的机器加工,故可明显降低制造成本。



1. 一种具有前金属壳的电连接器,其包括有:
一塑胶座体;
多个端子,其设于该塑胶座体;
一前金属壳,其是设于该塑胶座体的前端,其设有周边的平面及一中间的凸部,其两侧的平面各连接至少一固定板,该固定板延伸至该塑胶座体背面且末端设有一卡勾;及
二接板元件,其下段设有一接板部,其上段设有纵向的卡板;该卡板抵于塑胶座体两侧背面且与该前金属壳的固定板的卡勾卡定。
2. 如权利要求 1 所述的具有前金属壳的电连接器,其特征在于:该塑胶座体的两侧各设有至少一穿孔,该前金属壳两侧的固定板穿过该塑胶座体的穿孔。
3. 如权利要求 1 所述的具有前金属壳的电连接器,其特征在于:该前金属壳两侧的平面中间呈一侧向凸出的抵靠板,该前金属壳两侧的平面各连接的固定板数量为二,该二固定板分别连接于该抵靠板的上、下端,板面呈横向延伸,该塑胶座体的两侧各设有二横向的长形穿孔使该二固定板穿过。
4. 如权利要求 3 所述的具有前金属壳的电连接器,其特征在于:该抵靠板设有一螺孔,该塑胶座体两侧各设有一穿孔对应该螺孔。
5. 如权利要求 3 所述的具有前金属壳的电连接器,其特征在于:该接板元件的卡板设有螺孔,该塑胶座体两侧及前金属壳两侧的抵靠板各设有一穿孔对应该螺孔。
6. 如权利要求 3 所述的具有前金属壳的电连接器,其特征在于:该二固定板的卡勾设于板面二侧外缘,该接板元件的卡板设有一开孔配合该二固定板的卡勾卡定。
7. 如权利要求 3 所述的具有前金属壳的电连接器,其特征在于:该二固定板的卡勾设于板面二侧内缘,该二固定板的卡勾卡定接板元件的卡板两侧。
8. 如权利要求 3 所述的具有前金属壳的电连接器,其特征在于:该接板元件的卡板的下缘设有一向下的凸片,该二固定板的卡勾分别卡定于接板元件的卡板上缘及凸片。
9. 如权利要求 1 所述的具有前金属壳的电连接器,其特征在于:该前金属壳两侧的平面各连接的固定板数量为一,该固定板的板面呈纵向延伸,该固定板的卡勾卡定接板元件的卡板一侧,该塑胶座体背面设有一纵向延伸的卡槽卡定该接板元件的卡板另一侧。
10. 如权利要求 1 所述的具有前金属壳的电连接器,其特征在于:该接板元件的接板部为一弹性卡勾。

具有前金属壳的电连接器

【技术领域】

[0001] 本发明是关于一种电连接器,特别是关于一种具有前金属壳的电连接器。

【背景技术】

[0002] 请参阅图 1 及图 2,为一种现有的具有前金属壳的电连接器,其包括有一塑胶座体 10,其内排设有多个端子槽,其两侧各设有一穿孔 12;多个端子 14,其设于该塑胶座体 10 的端子槽,端子 14 的接脚伸出塑胶座体 10 外;一前金属壳 15,其是设于该塑胶座体 10 的前端,其设有两侧的平面 16 及一中间的凸部 17,该两侧的平面 16 各设有一穿孔 18;二接板元件 20,其是定位于该塑胶座体 10 的背面两侧,其下段设有一弹性卡扣 21,其上段设有一定位板 22,该定位板设有一穿孔 23;二铆钉 25,其设有一螺孔 26 及一卡面 27,其是穿过该该接板元件 20 的穿孔 23、塑胶座体 10 的穿孔 12、及前金属壳 15 的穿孔 18 后铆合固定;二螺件 28,其后段有外螺纹螺锁于该铆钉 25 的螺孔 26,其前段设有一螺孔 29,该螺件 28 的前端与前金属壳 15 的凸部 17 等高。

[0003] 现有构造是借由一铆钉 25 将前金属壳 15 及接板元件 20 铆合固定该塑胶座体 10,同时前金属壳 15 及接板元件 20 借由该铆钉 25 电气导通,使前金属壳 15 达到接地效果,最后再锁上一螺件 28 与前金属壳 15 的凸部 17 等高,如此在加工上较为费工,增加制造成本。

【发明内容】

[0004] 本发明的主要目的在于提供一种具有前金属壳的电连接器,借由前金属壳与接板元件的卡勾而结合于塑胶座体且两者电气导通,达到制造上的简便,降低制造成本。

[0005] 为达上述目的,本发明具有前金属壳的电连接器包括有:一塑胶座体;多个端子,其设于该塑胶座体;一前金属壳,其是设于该塑胶座体的前端,其设有周边的平面及一中间的凸部,其两侧的平面各连接至少一固定板,该固定板延伸至该塑胶座体背面且末端设有一卡勾;及二接板元件,其下段设有一接板部,其上段设有纵向的卡板;该卡板抵于塑胶座体两侧背面且与该前金属壳的固定板的卡勾卡定。

[0006] 借由以上说明,可知本发明在组装上仅是接板元件与前金属壳的固定板作简单的卡扣,两者即可稳固结合于该塑胶座体,且两者接触电气导通,使前金属壳形成接地效果,不需借由打铆钉的机器加工,故可明显降低制造成本。

[0007] 本发明的上述及其他目的、优点和特色由以下较佳实施例的详细说明中并参考图式当可更加明白。

【附图说明】

[0008] 图 1 是现有具有前金属壳的电连接器的立体组合图。

[0009] 图 2 是现有具有前金属壳的电连接器的立体分解图。

[0010] 图 3 是本发明第一实施例的立体组合图。

[0011] 图 4 是本发明第一实施例的立体组合图。

- [0012] 图 5 是本发明第一实施例的立体分解图。
[0013] 图 6 是本发明第二实施例的立体组合图。
[0014] 图 7 是本发明第二实施例的立体分解图。
[0015] 图 8 是本发明第三实施例的立体分解图。
[0016] 图 9 是本发明第三实施例的立体组合图。
[0017] 图 10 是本发明第三实施例的接板元件立体图。
[0018] 图 11 是本发明第四实施例的立体组合图。
[0019] 图 12 是本发明第四实施例的立体分解图。
[0020] 图 13 是本发明第五实施例的立体组合图。
[0021] 塑胶座体 30 凸部 32 横向长形穿孔 33 圆形穿孔 34
[0022] 卡槽 36 定位柱 37 纵向长形穿孔 35 端子 38
[0023] 前金属壳 40 平面 41 凸部 42 抵靠板 43
[0024] 螺孔 44 固定板 45 卡勾 46 圆形穿孔 47
[0025] 卡勾 48 接板元件 50 接板部 51 卡板 52 开孔 53
[0026] 螺孔 54 凸片 55

【具体实施方式】

[0027] 请参阅图 3、图 4 及图 5，为本发明第一实施例，其包括有：一塑胶座体 30、多个端子 38、一前金属壳 40、及二接板元件 50，其中：

[0028] 该塑胶座体 30 内排设有多个端子槽，其前端设有一凸部 32，其两侧各设有二横向长形穿孔 33，二横向长形穿孔 33 间设有一圆形穿孔 34，。

[0029] 该多个端子 38 设于该塑胶座体 30 的端子槽，端子 38 的接脚呈纵向伸出塑胶座体 30 外。

[0030] 该前金属壳 40 设于该塑胶座体 30 的前端，其设有周边的平面 41 及一中间的凸部 42，两侧的平面中间呈一侧向凸出的抵靠板 43，该抵靠板 43 中间设有一螺孔 44 且上、下端各连接一固定板 45，该两固定板 45 板面呈横向延伸且末端设有一卡勾 46，该固定板 45 是采板面下料使卡勾 46 形成于板面二侧外缘。

[0031] 该二接板元件 50 设于塑胶座体 30 背面二侧，其下段设有一接板部 51，该接板部 51 为一弹性卡勾，其上段设有一呈纵向的卡板 52，该卡板中间设有一开孔 53，该开孔的中段较上、下段为宽。

[0032] 在组装上动作如下：

[0033] 1. 该前金属壳 40 的凸部 42 套合该塑胶座体 30 的凸部 32，该抵靠板 43 平贴塑胶座体 30 的前端两侧，该两固定板 45 穿过二横向长形穿孔 33 至塑胶座体背面，该螺孔 44 对准该塑胶座体 30 的圆形穿孔 34。

[0034] 2. 该二接板元件 50 由上而下组装使其卡板 52 抵于塑胶座体 30 两侧背面且其开孔 53 的上、下段与该前金属壳 40 的固定板 45 的卡勾 46 卡定，开孔 53 的中段对准该塑胶座体 30 的圆形穿孔 34。

[0035] 借由以上说明，可知本发明在组装上仅是接板元件 50 与前金属壳 40 的固定板 45 作简单的卡扣，两者即可稳固结合于该塑胶座体 30，且两者接触电气导通，使前金属壳 40

形成接地效果,不需借由打铆钉的机器加工,故可明显降低制造成本。

[0036] 请参阅图 6 及图 7,为本发明第二实施例,其包括有:一塑胶座体 30、多个端子 38、一前金属壳 40、及二接板元件 50,其中:

[0037] 该塑胶座体 30 内排设有多个端子槽,其前端设有一凸部 32,其两侧各设有二横向长形穿孔 33。

[0038] 该多个端子 38 设于该塑胶座体 30 的端子槽,端子 37 的接脚呈纵向伸出塑胶座体 30 外。

[0039] 该前金属壳 40 设于该塑胶座体 30 的前端,其设有周边的平面 41 及一中间的凸部 42,两侧的平面中间呈一侧向凸出的抵靠板 43,该抵靠板 43 上、下端各连接一固定板 45,该两固定板 45 板面呈横向延伸且末端设有一卡勾 46,该固定板 45 是采板面下料使卡勾 46 形成于板面二侧内缘。

[0040] 该二接板元件 50 设于塑胶座体 30 背面二侧,其下段设有一接板部 51,该接板部 51 为一弹性卡勾,其上段设有一呈纵向的卡板 52。

[0041] 在组装上动作如下:

[0042] 1. 该前金属壳 40 的凸部 42 套合该塑胶座体 30 的凸部 32,该抵靠板 43 平贴塑胶座体 30 的前端两侧,该两固定板 45 穿过二横向长形穿孔 33 至塑胶座体背面。

[0043] 2. 该二接板元件 50 由上而下组装使其卡板 52 抵于塑胶座体 30 两侧背面且卡板 52 两侧与该前金属壳 40 的固定板 45 的卡勾 46 卡定。

[0044] 请参阅图 8、图 9 及图 10,为本发明第三实施例,其包括有:一塑胶座体 30、多个端子 38、一前金属壳 40、及二接板元件 50,其中:

[0045] 该塑胶座体 30 内排设有多个端子槽,其前端设有一凸部 32,其两侧各设有二横向长形穿孔 33,二横向长形穿孔 33 间设有一圆形穿孔 34。

[0046] 该多个端子 38 设于该塑胶座体 30 的端子槽,端子 38 的接脚呈纵向伸出塑胶座体 30 外。

[0047] 该前金属壳 40 设于该塑胶座体 30 的前端,其设有周边的平面 41 及一中间的凸部 42,两侧的平面中间呈一侧向凸出的抵靠板 43,该抵靠板 43 中间设有一圆形穿孔 47 且上、下端各连接一固定板 45,该上端的固定板 45 板面呈横向延伸且末端二侧向下弯折设有一卡勾 46,该下端的固定板 45 板面呈横向延伸且末端中间向上弯折设有一卡勾 48。

[0048] 该二接板元件 50 设于塑胶座体 30 背面二侧,其下段设有一接板部 51,该接板部 51 为一弹性卡勾,其上段设有一呈纵向的卡板 52,该卡板中间设有一螺孔 54,卡板的下缘设有一向下的凸片 55(参阅图 10)。

[0049] 在组装上动作如下:

[0050] 1. 该前金属壳 40 的凸部 42 套合该塑胶座体 30 的凸部 32,该抵靠板 43 平贴塑胶座体 30 的前端两侧,该两固定板 45 穿过二横向长形穿孔 33 至塑胶座体背面,该圆形穿孔 47 对准该塑胶座体 30 的圆形穿孔 34。

[0051] 2. 该二接板元件 50 由侧向组装使卡板 52 抵于塑胶座体 30 两侧背面,卡板 52 上缘为前金属壳 40 的固定板 45 的卡勾 46 卡定且凸片 55 为卡勾 48 卡定,螺孔 54 对准该塑胶座体 30 的圆形穿孔 34。

[0052] 请参阅图 11 及图 12,为本发明第四实施例,其包括有:一塑胶座体 30、多个端子

38、一前金属壳 40、及二接板元件 50, 其中:

[0053] 该塑胶座体 30 内排设有多个端子槽, 其前端设有一凸部 32, 其两侧各设有一纵向长形穿孔 35、一圆形穿孔 34 及一纵向的卡槽 36。

[0054] 该多个端子 38 设于该塑胶座体 30 的端子槽, 端子 38 的接脚呈纵向伸出塑胶座体 30 外。

[0055] 该前金属壳 40 设于该塑胶座体 30 的前端, 其设有周边的平面 41 及一中间的凸部 42, 两侧的平面设有一圆形穿孔 47 且各连接一固定板 45, 该固定板 45 的板面呈纵向延伸且末端的上、下端弯折设有一卡勾 46。

[0056] 该二接板元件 50 设于塑胶座体 30 背面二侧, 其下段设有一接板部 51, 该接板部 51 为一弹性卡勾, 其上段设有一呈纵向的卡板 52, 该卡板中间设有一螺孔 54。

[0057] 在组装上动作如下:

[0058] 1. 该前金属壳 40 的凸部 42 套合该塑胶座体 30 的凸部 32, 该前金属壳 40 两侧的固定板 45 穿过纵向长形穿孔 35 至塑胶座体背面, 该圆形穿孔 47 对准该塑胶座体 30 的圆形穿孔 34。

[0059] 2. 该二接板元件 50 由上而下组装使其卡板 52 抵于塑胶座体 30 两侧背面, 该固定板 45 的卡勾 46 卡定接板元件 50 的卡板 52 一侧, 该塑胶座体的卡槽 36 卡定该接板元件 50 的卡板 52 另一侧, 螺孔 54 对准该塑胶座体 30 的圆形穿孔 34。

[0060] 请参阅图 13, 为本发明第五实施例, 其大致与第一实施例相, 其中差异在于本实施例的二接板元件 50 的接板部 51 呈水平, 各端子 38 的接脚呈水平, 另外该塑胶座体 30 底部四周各设有一定位柱 37, 本实施例是以表面粘着方式焊接于电路板上。

[0061] 上述的各种实施例皆为母座型态的电连接器, 即该塑胶座体前端设有一凸部者, 各端子为母端子型态排列设于该凸部内, 然而若是公座型态的电连接器者同样可以应用本发明实施, 公座型态的电连接器的塑胶座体前端未设有一凸部, 而各端子为公端子型态, 其具有一针状的接触端凸出塑胶座体前端。

[0062] 在较佳实施例的详细说明中所提出的具体的实施例仅为了易于说明本发明的技术内容, 而并非将本发明狭义地限制于该实施例, 在不超出本发明的精神及申请专利范围的情况, 可作种种变化实施。

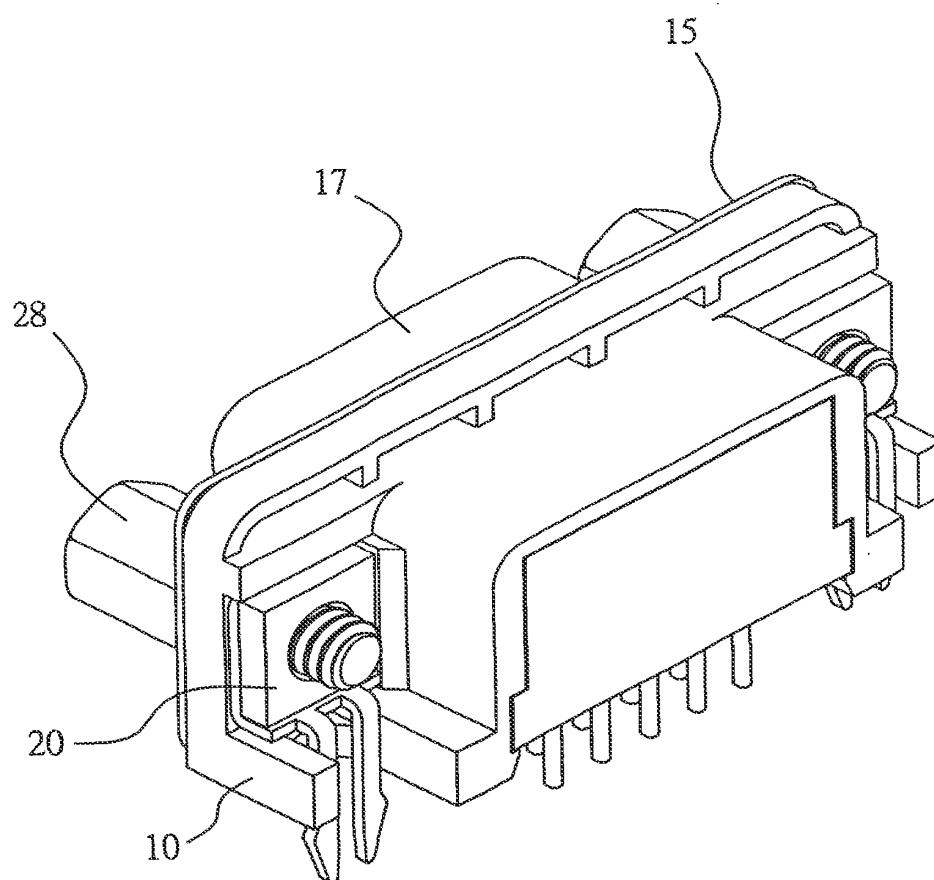


图 1

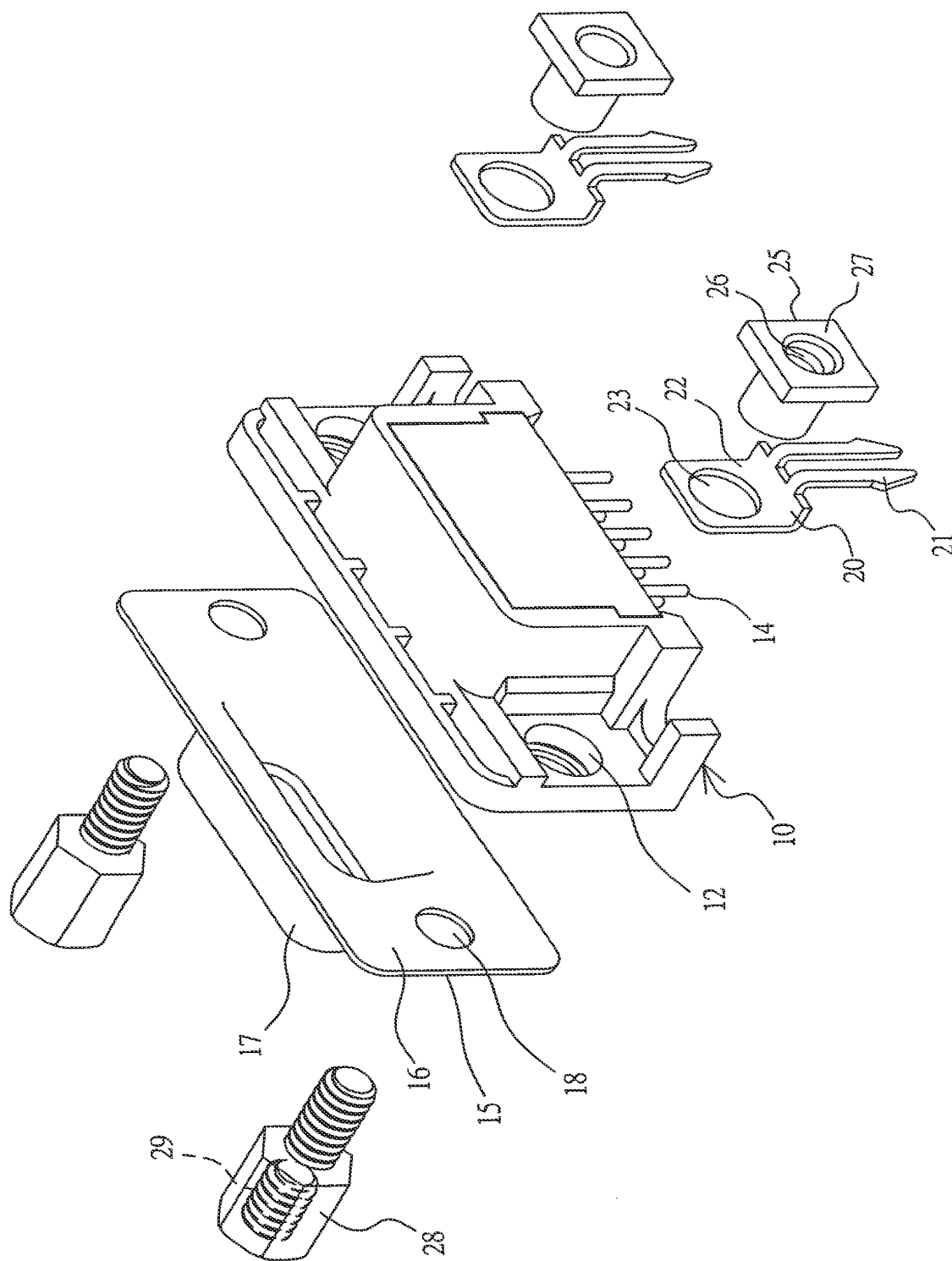


图 2

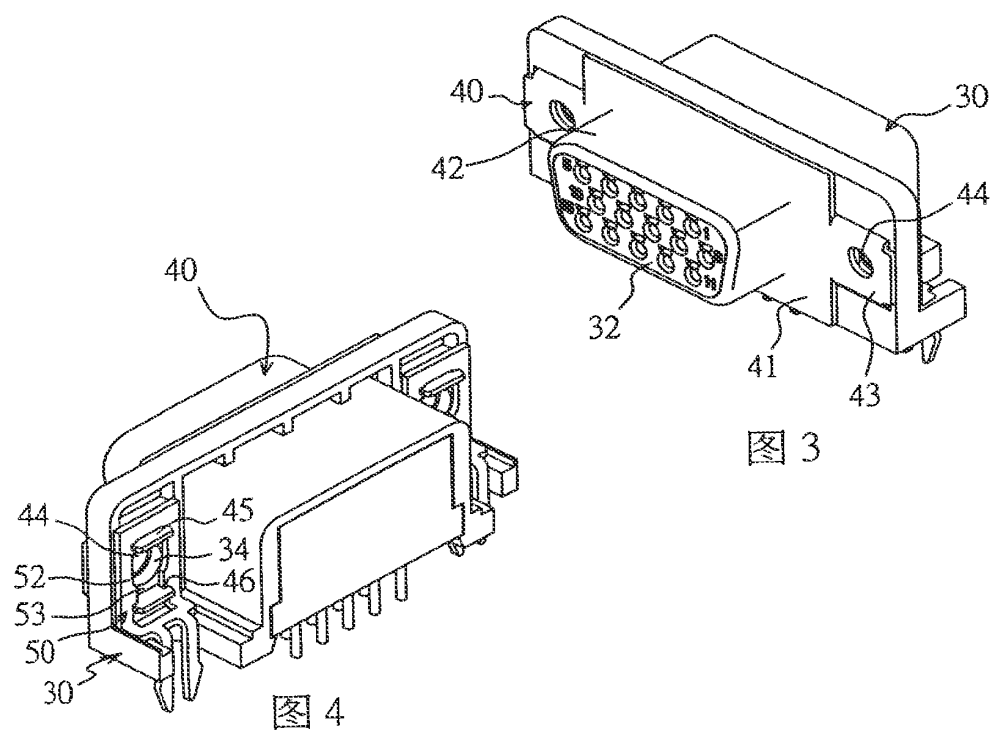
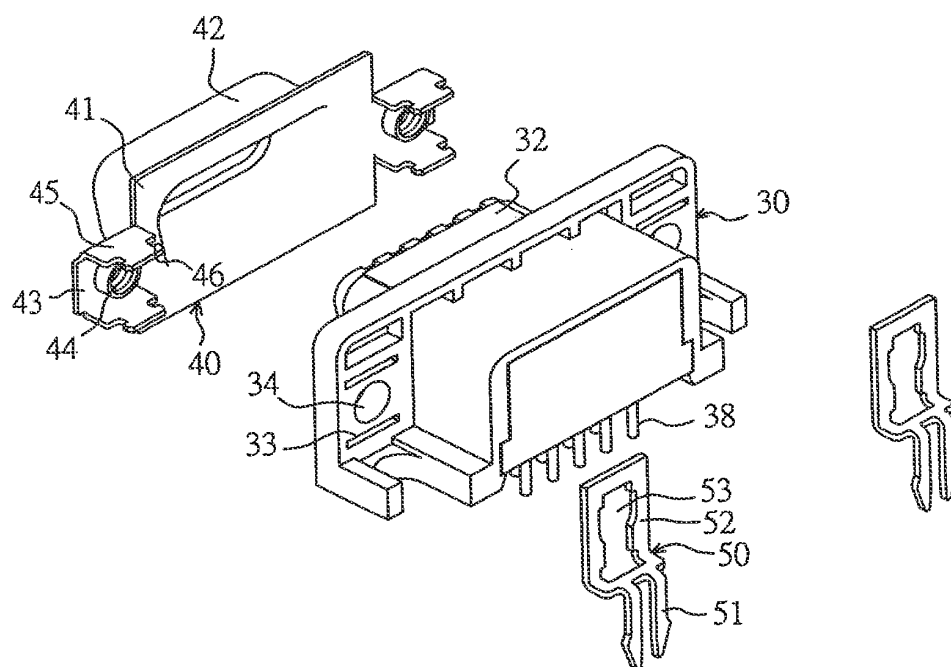


图 5

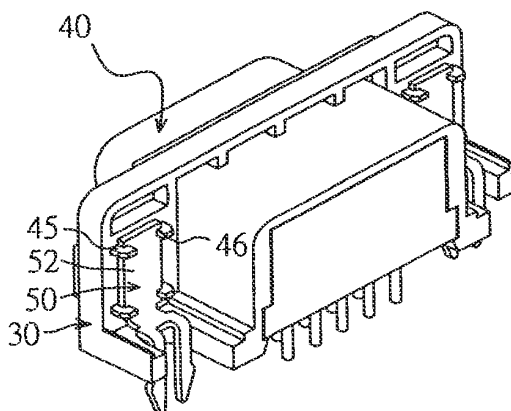


图 6

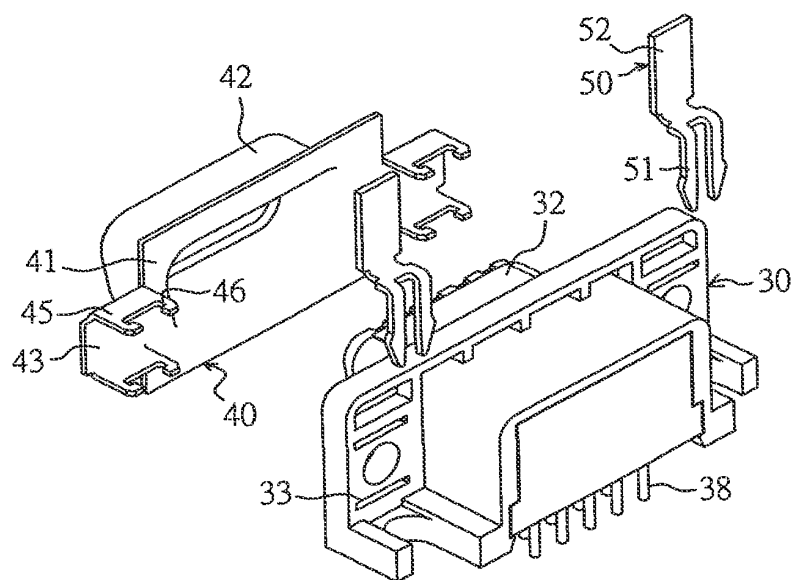


图 7

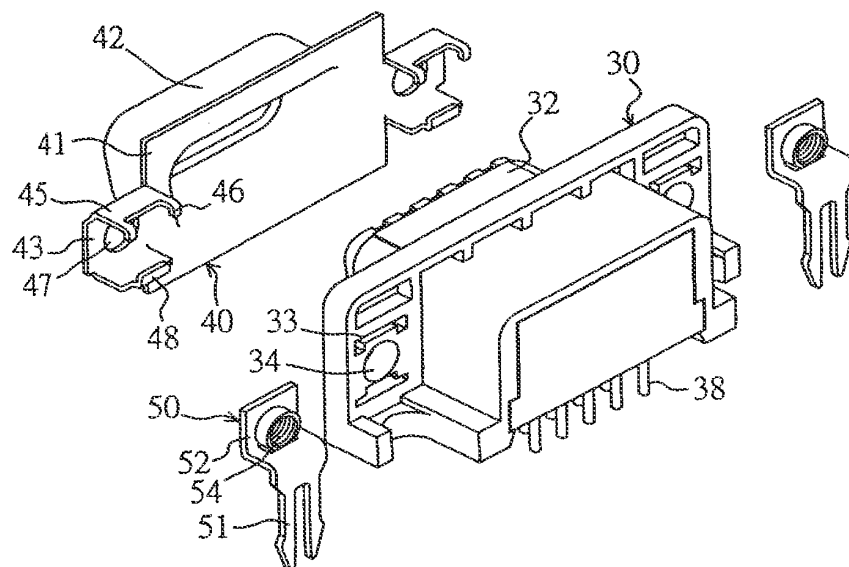


图 8

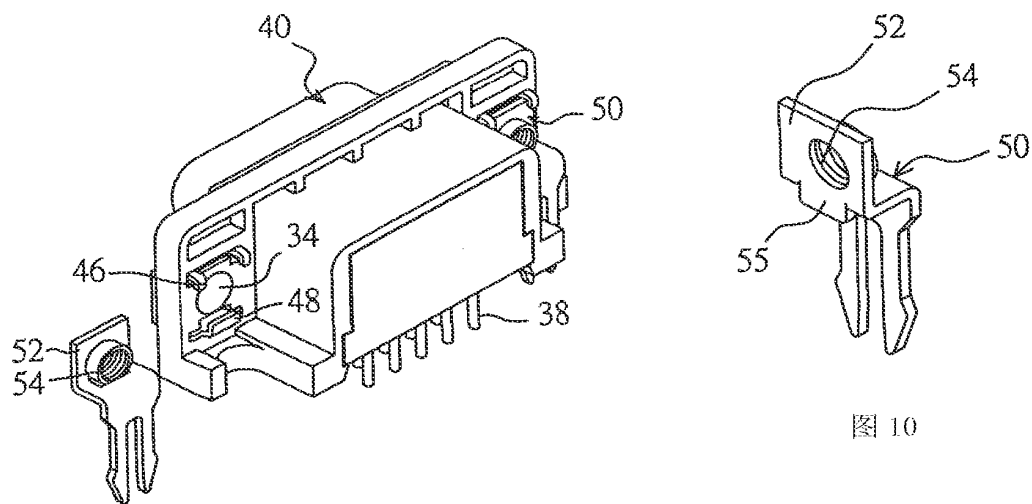


图 9

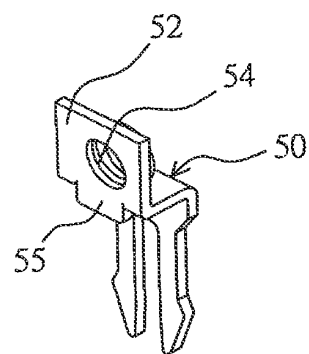


图 10

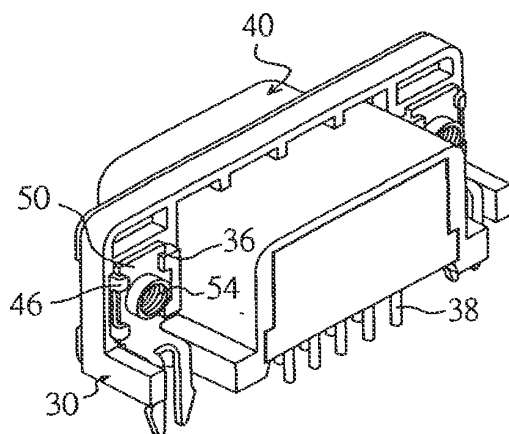


图 11

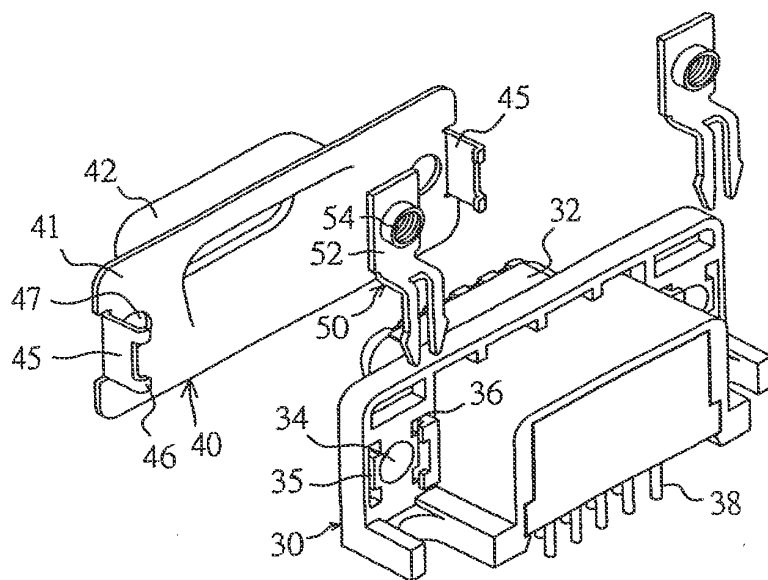


图 12

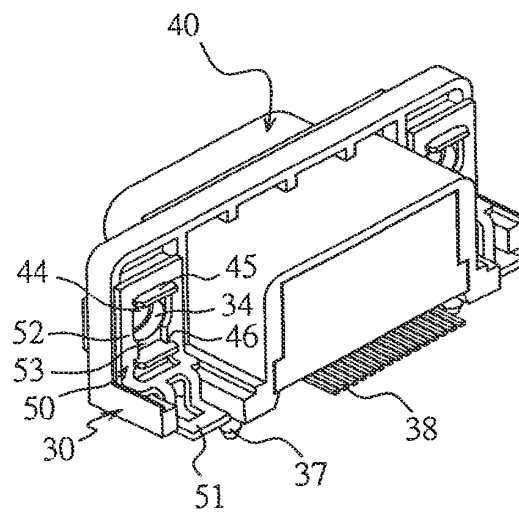
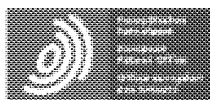


图 13



Espacenet

Bibliographic data: CN201533031 (U) — 2010-07-21**Electrical connecting socket**

Inventor(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)
Applicant(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)
Classification: - **international:** *H01R13/46; H01R13/64*
- **cooperative:**
Application number: CN200920155205U 20090526
Priority number(s): CN200920155205U 20090526

Abstract of CN201533031 (U)

The utility model relates to an electrical connecting socket comprising a plastic socket body, a tongue piece, a connecting groove and a first terminal, wherein the first terminal is provided with a first extending part and a first fixing part, the first extending part is connected with a first contact part, the first contact part of the first terminal is positioned at one surface of the tongue piece, and the first terminal is electrically connected with a first pin; a blocking surface is formed at two sides of the tongue piece, and the connecting groove extends backwards into the plastic socket body from the blocking surface at one surface of the tongue piece; a second terminal is also arranged at one surface of a rear section of the connecting groove opposite to one surface of the tongue piece; and the second terminal is integrally provided with a second extending part and a second fixing part, the second extending part is connected with a second contact part and extends to the rear section of the connecting groove, the second terminal is electrically connected with a second pin, the second contact part protrudes from the second extending part, and the second contact part of the second terminal faces towards the first terminal; and one surface of the tongue piece is also provided with another first contact part which is positioned behind the first contact part of the first terminal. The electrical connecting socket can achieve convenience and diversity of use.



(12) 实用新型专利

(10) 授权公告号 CN 201533031 U

(45) 授权公告日 2010.07.21

(21) 申请号 200920155205.1

(22) 申请日 2009.05.26

(66) 本国优先权数据

200910132295.7 2009.04.30 CN

(73) 专利权人 蔡周贤

地址 中国台湾台北县

(72) 发明人 蔡周贤

(74) 专利代理机构 永新专利商标代理有限公司

72002

代理人 李树明

(51) Int. Cl.

H01R 12/14 (2006.01)

H01R 13/64 (2006.01)

H01R 13/46 (2006.01)

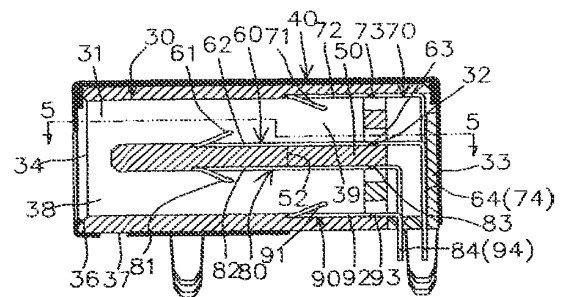
权利要求书 2 页 说明书 8 页 附图 14 页

(54) 实用新型名称

电连接插座

(57) 摘要

一种电连接插座,包括:塑胶座体;舌片;连接槽;第一端子,设有第一延伸部及第一固定部,第一延伸部连接第一接触部,第一端子的第一接触部位于舌片一面,第一端子电连接第一接脚;舌片的两侧形成一挡面,连接槽于舌片一面由挡面更往后延伸至塑胶座体内;相对于上述舌片一面的连接槽后段一面还设有第二端子,第二端子一体设有第二延伸部及第二固定部,第二延伸部连接第二接触部,第二延伸部延伸于连接槽后段,第二端子电连接第二接脚,第二接触部凸出第二延伸部,第二端子的第二接触部朝向第一端子;舌片一面还设有另一第一接触部,另一第一接触部位于第一端子的第一接触部的后方。本实用新型可达到使用上的方便性及多元性。



1. 一种电连接插座,包括有:

一塑胶座体;

一舌片,设于该塑胶座体前端;

一连接槽,位于该塑胶座体前端并将该舌片包覆于内,其前端为一插入口;及

至少一排第一端子,该第一端子一体设有一第一延伸部及一第一固定部,该第一延伸部连接一第一接触部,该第一延伸部延伸至该连接槽内,该至少一排第一端子的第一接触部呈间隔排列位于该舌片一面,该第一端子电连接一第一接脚伸出该塑胶座体外;

其特征在于:其中该舌片的两侧设有凹口而形成一挡面,该连接槽于该舌片一面由该挡面更往后延伸至该塑胶座体内,该挡面前方为连接槽前段,该挡面后方为连接槽后段;相对于上述舌片一面的该连接槽后段一面还设有至少一排第二端子,该第二端子一体设有一第二延伸部及一第二固定部,该第二延伸部连接一第二接触部,该第二延伸部延伸于该连接槽后段,该第二端子电连接一第二接脚伸出该塑胶座体外,该第二接触部凸出该第二延伸部,该一排第二端子的第二接触部呈间隔排列且朝向该至少一排第一端子;该舌片一面还设有至少一排另一第一接触部,该至少一排另一第一接触部位于该一排第一端子的第一接触部的后方。

2. 如权利要求 1 所述的电连接插座,其特征在于:该一排第一端子的第一接触部凸出该舌片一面并可弹动。该第一端子的第一固定部后端一体连接该第一接脚,该第二端子的第二固定部后端一体连接该第二接脚。

3. 如权利要求 1 或 2 所述的电连接插座,其特征在于:该至少一排另一第一接触部是一体相连于该一排第一端子的第一延伸部。

4. 如权利要求 1 所述的电连接插座,其特征在于:该连接槽能够连接一接头,该接头仅有一面设有至少一排接点与该至少一排第一接触部或至少一排第二接触部电连接。

5. 如权利要求 4 所述的电连接插座,其特征在于:该至少一排第一端子的第一接触部和至少一排第二端子的第二接触部为相同的连接介面且序号相互为反向排列而皆可电连接该接头,当该接头正、反双向插入该连接槽时皆可电连接。

6. 如权利要求 4 所述的电连接插座,其特征在于:该至少一排第一端子的第一接触部和至少一排第二端子的第二接触部为不相同的连接介面而能够分别电连接该接头及另一不同连接介面的接头。

7. 如权利要求 4 所述的电连接插座,其特征在于:该连接槽于舌片上、下方形成对称的轮廓,该连接槽于该舌片另一面由该挡面更往后延伸至该塑胶座体内,且还设有至少一排第三端子及至少一排第四端子,该第三端子一体设有一第三延伸部及一第三固定部,该第三延伸部连接一第三接触部,该第三延伸部延伸至该连接槽内,该至少一排第三端子的第三接触部呈间隔排列位于该舌片另一面,该第三端子电连接一第三接脚伸出该塑胶座体外,另外该一排第三端子的第三接触部后方设有至少一排另一第三接触部;该至少一排第四端子设于相对于上述舌片另一面的连接槽后段另一面,该第四端子一体设有一第四延伸部及一第四固定部,该第四延伸部连接一第四接触部,该第四延伸部延伸于该连接槽后段,该第四端子电连接一第四接脚伸出该塑胶座体外,该第四接触部凸出该第四延伸部,该一排第四端子的第四接触部呈间隔排列且朝向该至少一排第三端子。

8. 如权利要求 7 所述的电连接插座,其特征在于:该至少一排第一端子的第一接触部、

至少一排第二端子的第二接触部、至少一第三端子的第三接触部、及至少一第四端子的第四接触部为相同的连接介面而皆可电连接该接头,该一排第一端子和一排第四端子为相同序号排列,该一排第二端子和一排第三端子为相同序号排列,该一排第一端子和一排第二端子为相反序号排列,该接头可正反双向插入该连接槽电连接。

9. 如权利要求 8 所述的电连接插座,其特征在于:其为一 USB 介面的电连接插座,其中一排第一端子、一排第二端子、一排第三端子、和一排第四端子各自有四个。

10. 如权利要求 1 所述的电连接插座,其特征在于:该第一端子的第一延伸部板面平贴于该舌片一面,该第一端子的第一接触部一端连接于第一延伸部且由前而后渐凸出第一延伸部板面并延伸至另一端成开放,该第二端子的第二延伸部板面平贴于该连接槽后段一面,该第二端子的第二接触部一端连接于第二延伸部且由前而后渐凸出第二延伸部板面并延伸至另一端成开放。

电连接插座

【技术领域】

[0001] 本实用新型是关于一种电连接器,特别是关于一种电连接插座。

【背景技术】

[0002] 现今电脑设备最普及的讯号传输规格莫过于通用串行总线 (Universal Serial Bus, 简称 USB), 以此规格制作的连接器插座及传输线可使外接于电脑的周边设备, 如滑鼠、储存卡、键盘等, 即时为电脑所测得并立即使用。

[0003] 目前普遍使用的随身碟亦属于一种储存卡, 此种储存卡的接头分成无金属外壳和有金属外壳二种。

[0004] 请参阅图 1, 为一种储存卡 20 的三视图, 其一端设有一接头 21, 该接头 21 为 USB2.0 型式且无金属外壳, 该接头 21 一面设有 4 个间隔排列且不弹动的接点 22。

[0005] 此种随身碟 20 可以配合一 USB 插座作电连接, 由于目前 USB 插座是于其内的舌片一面设有一排接点, 在使用上, 随身碟 20 需插入方向正确才能使两者的接点对上电连接; 为了确保储存卡插入时能电连接, 两者在对接上具有防呆设计, 即当随身碟的接头反向插入时则无法插入, 使用者即会再换另一个方向插入, 方向正确了才能插入, 如此即可确保插入后具有电连接。

[0006] 使用者通常是随机插入, 故插不进去的机率是 1/2, 故常常是插两次, 造成使用上的不便。

[0007] 请参阅图 2 及图 3, 为一种讯号线的接头, 其为 USB2.0 接头 10, 其设有一塑胶座体 12 及一金属外壳 13, 该金属外壳 13 包覆该塑胶座体 12, 该金属外壳 13 和该塑胶座体 12 间形成一空间 14, 该塑胶座体 12 一面设有一排接点 11。

[0008] 在使用上, USB2.0 接头 10 亦需插入方向正确才能与 USB2.0 插座的接点对上电连接, 同样为了确保 USB2.0 接头插入时能电连接, 两者在对接上具有防呆设计, 即当 USB2.0 接头反向插入时则无法插入, 使用者即会再换另一个方向插入, 方向正确了才能插入, 如此即可确保插入后具有电连接, 使用者通常是随机插入, 故插不进去的机率是 1/2, 故亦造成使用上的不便。

[0009] 再者, 接头的种类日益增加, 亦有相同外形然而连接介面不同者, 若两种相同外形然而连接介面不同的接头若能皆以同一插座来电连接, 则能达到使用上的多元性。

【实用新型内容】

[0010] 本实用新型的主要目的在于提供一种电连接插座, 其是于舌片上设有至少一排端子的一相对面另设有至少一排端子, 使达到使用上的方便性及多元性, 且整体电连接插座的长度和高度均能合乎标准规格。

[0011] 本实用新型的另一主要目的在于提供一种电连接插座, 其是于舌片的挡面向后延伸设有连接槽后段, 并于该连接槽后段的顶面或底面设有至少一排端子, 该至少一排端子是采用弹片式的接触部且由前往后延伸渐凸出, 当受挤压时即贴平于连接槽后段的顶、底

面,故,几乎不占用到塑胶座体高度的空间,不会过量增加了整体插座的高度,且亦不增加长度,并能达到使用上的方便性及多元性。

[0012] 本实用新型的再一主要目的在于提供一种电连接插座,其是于舌片的挡面向后延伸设有连接槽后段,并于该连接槽后段另设有至少一排端子对应舌片的至少一排端子,其中该舌片上于一排端子的接触部后方设有至少一排另一接触部,借此达到确保电连接。

[0013] 本实用新型的再一主要目的在于提供一种电连接插座,其舌片设于其连接槽内高度的中间,使连接槽于舌片上、下方形成对称的轮廓,舌片两面皆设有至少一排端子,对应舌片两面的两对应面亦各有至少一排端子,借此达到使用上的方便性及多元性。

[0014] 为达上述目的,本实用新型提供一种电连接插座,包括有:

[0015] 一塑胶座体;

[0016] 一舌片,设于该塑胶座体前端;

[0017] 一连接槽,位于该塑胶座体前端并将该舌片包覆于内,其前端为一插入口;及

[0018] 至少一排第一端子,该第一端子一体设有一第一延伸部及一第一固定部,该第一延伸部连接一第一接触部,该第一延伸部延伸至该连接槽内,该至少一排第一端子的第一接触部呈间隔排列位于该舌片一面,该第一端子电连接一第一接脚伸出该塑胶座体外;

[0019] 其特征在于:其中该舌片的两侧设有凹口而形成一挡面,该连接槽于该舌片一面由该挡面更往后延伸至该塑胶座体内,该挡面前方为连接槽前段,该挡面后方为连接槽后段;相对于上述舌片一面的该连接槽后段一面还设有至少一排第二端子,该第二端子一体设有一第二延伸部及一第二固定部,该第二延伸部连接一第二接触部,该第二延伸部延伸于该连接槽后段,该第二端子电连接一第二接脚伸出该塑胶座体外,该第二接触部凸出该第二延伸部,该一排第二端子的第二接触部呈间隔排列且朝向该至少一排第一端子;该舌片一面还设有至少一排另一第一接触部,该至少一排另一第一接触部位于该一排第一端子的第一接触部的后方。

[0020] 综上所述,本实用新型的电连接插座可达到使用上的方便性及多元性。

[0021] 本实用新型的上述及其他目的、优点和特色由以下较佳实施例的详细说明中并参考图式当可更加明白。

【附图说明】

[0022] 图1是习知储存卡的三视图。

[0023] 图2是习知的USB2.0接头的前视图。

[0024] 图3是习知的USB2.0接头的侧视图。

[0025] 图4是本实用新型第一实施例的侧视剖面图。

[0026] 图5是本实用新型第一实施例的上视剖面图。

[0027] 图6是本实用新型第一实施例的前视图。

[0028] 图7是本实用新型第一实施例正向插入USB2.0接头的使用状态图。

[0029] 图7A是本实用新型第一实施例的前视图及USB2.0接头正向的前视图。

[0030] 图8是本实用新型第一实施例反向插入USB2.0接头的使用状态图。

[0031] 图8A是本实用新型第一实施例的前视图及USB2.0接头反向的前视图。

[0032] 图9是本实用新型第一实施例反向插入储存卡的使用状态图。

- [0033] 图 10 是本实用新型第一实施例正向插入储存卡的使用状态图。
- [0034] 图 11 是本实用新型第二实施例的侧视剖面图。
- [0035] 图 12 是本实用新型第三实施例的侧视剖面图。
- [0036] 图 13 是本实用新型第四实施例的侧视剖面图。
- [0037] 图 14 是本实用新型第五实施例的侧视剖面图。
- [0038] 图 15 是本实用新型第六实施例的侧视剖面图。
- [0039] 图 16 是本实用新型第七实施例的侧视剖面图。
- [0040] 图 17 是本实用新型第七实施例的上视剖面图。
- [0041] 图 18 是本实用新型第八实施例的侧视剖面图。
- [0042] 图 19 是本实用新型第八实施例的上视剖面图。
- [0043] 图 20 是本实用新型第八实施例的底视剖面图。
- [0044] 图 21 是习知储存卡的三视图。
- [0045] 图 22 是本实用新型第八实施例插入 USB2.0 接头的使用状态图。
- [0046] 图 23 是本实用新型第八实施例插入储存卡的使用状态图。
- [0047] 图 24 是本实用新型第九实施例的侧视剖面图。
- [0048] 图 25 是本实用新型第九实施例插入接头的使用状态图。
- [0049] 图 26 是本实用新型第九实施例插入储存卡的使用状态图。
- [0050] 图 27 是本实用新型第十实施例的前视图。
- [0051] 图 28 是本实用新型第十实施例的侧视剖面图。
- [0052] 图 29 是本实用新型第十实施例的上视剖面图。
- [0053] 图 30 是本实用新型第十实施例的底视剖面图。
- [0054] 图 31 是本实用新型第十一实施例的前视图。
- [0055] 图 32 是本实用新型第十二实施例的前视图。
- [0056] 图 33 是本实用新型第十二实施例的侧视剖面图。
- [0057] USB2.0 接头 10 接点 11 塑胶座体 12 金属外壳 13
- [0058] 空间 14 15 接头 接点 16 储存卡 20 接头 21
- [0059] 接点 22 储存卡 25 接头 26
- [0060] 接点 27
- [0061] 塑胶座体 30 连接槽 31 端子卡槽 32 后盖 33
- [0062] 插入口 34 连接槽底部 36 底面 37 连接槽前段 38
- [0063] 连接槽前段 39 宽槽 310 窄槽 311
- [0064] 金属外壳 40 舌片 50 第一端子 60 第一接触部 61
- [0065] 延伸部 62 固定部 63 接脚 64 缺口 65
- [0066] 第一端子 66 第一接触部 67 伸部 68 固定部 69 接脚 610
- [0067] 第二端子 70 第二接触部 71 延伸部 72
- [0068] 固定部 73 接脚 74 第二端子 76 第二接触部 77
- [0069] 第三端子 80 第三接触部 81 延伸部 82 固定部 83
- [0070] 接脚 84 第三端子 86 第三接触部 87
- [0071] 第四端子 90 第四接触部 91 延伸部 92 固定部 93

[0072] 接脚 94 第四端子 96 第四接触部 97

【具体实施方式】

[0073] 请参阅图 4、图 5 及图 6，本实施例为一 USB2.0 插座，其包括一塑胶座体 30、一金属外壳 40、一舌片 50、一排第一端子 60、及一排第二端子 70，其中：

[0074] 该塑胶座体 30 一体成型有一连接槽 31，其后端设有四排端子卡槽 32，另设有一后盖 33 由下而上盖合，该连接槽 31 位于该塑胶座体 30 前段且前端设有一插入口 34，该连接槽 31 的底部 36 不低于该整体连接槽 31 下方的塑胶座体的底面 37。

[0075] 该金属外壳 40 包覆该塑胶座体 30。

[0076] 该舌片 50 是与该塑胶座体 30 一体射出成型，该舌片 50 水平设于该塑胶座体 30 前端并位于该连接槽 31 内正中间，使该连接槽 31 于舌片 50 上、下方形成对称的轮廓且于舌片 50 左、右侧亦形成对称的轮廓，如此可使同一接头正反双向均可插入定位于该连接槽 31 内，该舌片 50 的两侧设有凹口 51 而形成一挡面 52，该连接槽 31 于该舌片 50 两面由该挡面 52 更往后延伸至该塑胶座体 30 内，该挡面 52 前方为连接槽前段 38，该挡面 52 后方为连接槽后段 39，该连接槽后段 39 设有与该舌片 50 上、下两面齐平的二面。

[0077] 该一排第一端子 60 共计 4 支呈间隔排列固定于该塑胶座体 30，其由左至右端子的序号为 4,3,2,1(参阅图 6) 该第一端子 60 由前而后一体设有一第一接触部 61、一第一延伸部 62、一第一固定部 63 及一第一接脚 64，该第一固定部 63 与该塑胶座体 30 的舌片上面的端子卡槽 32 固定，该第一延伸部 62 向舌片 50 前端延伸，该第一延伸部 62 板面平贴于该舌片 50 上面且与该舌片 50 上面齐平，该第一延伸部 62 前段板面设有一较该第一接触部 61 板面大的缺口 65，该第一接触部 61 一端连接于该第一延伸部 62 且由前而后渐凸出该第一延伸部 62 板面并延伸至另一端成开放，如此该第一接触部 61 凸出该舌片 50 上面并可上下弹动，当第一接触部 61 被压平时则可平贴于该缺口 65，该第一接脚部 64 伸出该塑胶座体 30 外。

[0078] 该一排第二端子 70 共计 4 支呈间隔排列位于该连接槽 31 顶面，其由前而后一体设有一第二接触部 71、一第二延伸部 72、一第二固定部 73 及一第二接脚 74，该第二固定部 73 与该塑胶座体 30 上端的端子卡槽 32 固定，该一排第二端子 70 与该一排第一端子 60 构造是相同的且呈相同连接介面，然而该一排第二端子 70 由左至右端子的序号为 1,2,3,4 恰与一排第一端子 60 的序号排列相反，该一排第二接触部 71 呈间隔排列位于该连接槽后段 39，第二接触部 71 是凸出第二延伸部 72 并可弹动且朝向该一排第一端子 60。

[0079] 该一排第三端子 80 共计 4 支呈间隔排列固定于该塑胶座体 30，其由前而后一体设有一第三接触部 81、一第三延伸部 82、一第三固定部 83 及一第三接脚 84，该第三固定部 83 与该塑胶座体 30 于舌片下面的端子卡槽 32 固定，该一排第三端子 80 与该一排第一端子 60 构造是相同的且呈相同连接介面，该一排第三端子 80 的序号排列为 1,2,3,4 与该一排第二端子 70 相同，该一排第三接触部 81 呈间隔排列位于该舌片 50 下面并由前而后渐凸出舌片 50 下面。

[0080] 该一排第四端子 90 共计 4 支呈间隔排列位于该连接槽 31 底面，其一体设有一第四接触部 91、一第四延伸部 92、一第四固定部 93 及一第四接脚 94，该第四固定部 93 与该塑胶座体 30 下端的端子卡槽 32 固定，该一排第四端子 90 与该一排第一端子 60 构造是相同

的且呈相同连接介面,该一排第四端子 90 的序号排列为 4,3,2,1 与该一排第一端子 60 相同,该一排第四接触部 91 呈间隔排列位于该连接槽 31 后段底面并朝向该一排第三端子 80。

[0081] 借由以上构造,请参阅图 7 及图 7A,是为一讯号线的 USB2.0 接头使用状态图,图 7A 为本创作插座和接头 10 正向的前视图,该 USB2.0 接头 10 设有一塑胶座体 12 及一金属外壳 13,该金属外壳 13 包覆该塑胶座体 12,该金属外壳 13 和该塑胶座体 12 间形成一空间 14,该塑胶座体 12 一面设有一排接点 11,由前视时该一排接点 11 由左至右的序号为 4,3,2,1 当 USB2.0 接头 10 的接点 11 朝上呈正向转向该连接槽 45 插入时,其空间 14 为该舌片 50 所套入,其一排接点 11 即转向成由左至右的序号为 1,2,3,4 与舌片 50 下方的第三端子 80 的第三接触部 81 电连接(同样由左至右的序号为 1,2,3,4),由于 USB2.0 接头 10 可为该舌片 50 的挡面 52 所挡止,故不会继续插入而使其金属外壳 13 碰触该第四接触部 91;请参阅图及图 8A,USB2.0 接头 10 反向插入时,其空间 14 亦为该舌片 50 所套入,其一排接点 11 即转向成由左至右的序号为 4,3,2,1 与舌片 50 上方的该第一端子 60 的第一接触部 61 电连接,其金属外壳 13 同样不会碰触该第二接触部 71,借由以上的说明,可知本实用新型可供 USB2.0 接头 10 正、反双向插入电连接,达到使用上的方便性。

[0082] 请参阅图 9,是为储存卡 20 的使用状态,当该接头 21 的一排接点 22 是朝下呈反向插接于该舌片 50 上方时是与舌片上方的一排第一端子 60 的第一接触部 61 电连接,若插接于该舌片 50 下方则与一排第四端子 90 的第四接触部 91 电连接;请参阅图 10,当该接头 21 的一排接点 22 是朝上呈正向插接于该舌片 50 下方时是与舌片下方的一排第三端子 80 的第三接触部 81 电连接,若插接于该舌片 50 上方则与一排第二端子 70 的第二接触部 71 电连接;由以上的说明可知本实用新型当连接此种不具金属外壳的储存卡时可作为双槽使用而能同时连接二个储存卡,且该储存卡正反双向插接于任一槽均可电连接。

[0083] 本实用新型是在 USB 插座的标准高度及长度下作设计,即本实用新型的连接槽 31 是直接自舌片 50 的挡面 52 往塑胶座体 30 内延伸而形成连接槽后段 39,本实用新型仅是善用原本的塑胶座体 30 的空间,故不会增加整体插座的长度,再者,本实施例的第二、四端子 70、90 是采用弹片式的接触部且由前往后延伸渐凸出,当受挤压时即贴乎于连接槽后段的顶、底面,故,几乎不占用到塑胶座体高度的空间,不会过量增加了整体插座的高度。

[0084] 请参阅图 11,是本实用新型第二实施例,其大致与第一实施例相同,其差异在于本实施例的第一端子 60 设有一前一后的两凸出的第一接触部 61,该第三端子 80 亦设有一前一后的两凸出的第三接触部 81,如此第一端子 60 及第三端子 80 均可较为对正连接 USB2.0 接头 10 的接点 11 和储存卡的接点 22,并能确保电连接,再者,当储存卡的接点 22 朝下插入舌片上方时,其接点会先与第一端子 60 前段的第一接触部 61 导通,接着再与后段的第一接触部 61 导通时仍与前段的第一接触部 61 导通,最后插至定位时才脱离前段的第一接触部 61。

[0085] 请参阅图 12,是本实用新型第三实施例,其大致与第二实施例相同,其差异在于本实施例仅于舌片上面设有第一端子 60 及对应该第一端子 60 的第二端子 70,在使用上,USB2.0 接头只能接点朝下插入连接槽 31 与舌片 50 上方的第一接触部 61 电连接,然而储存卡仍可插于舌片 50 上方,正反双向皆可电连接。

[0086] 请参阅图 13,是本实用新型第四实施例,其大致与第一实施例相同,其差异在于本实施例仅于舌片上面设有第一端子 60 及对应该第一端子 60 的第二端子 70。

[0087] 请参阅图 14,是本实用新型第五实施例,其大致与第一实施例相同,其差异在于本实施例的第二端子 70 的第二接触部 71 连接于第二延伸部 72 前端并向前呈一凸出接点,如
此第一、二接触部 61、71 可较为接近,而该第四端子 90 的第四接触部 91 亦同。

[0088] 请参阅图 15,是本实用新型第六实施例,其大致与第四实施例相同,其差异在于本
实施例的连接槽后段 39 由塑胶座体 30 一体设成,而连接槽前段 38 则由金属外壳 40 形成。

[0089] 请参阅图 16 及图 17,是本实用新型第七实施例,其为一 USB3.0 插座,其大致与第
一实施例相同,由于 USB3.0 接头的接点有两排,除了 USB2.0 的一排 4 个不弹动的接点外另
设有一排 5 个可弹动的接点,故本实施例除了与第一实施例相同设有一排第一端子 60、一
排第二端子 70、一排第三端子 80 及一排第四端子 90 外,需另设有 5 个成一排相同介面的一
排第一端子 66、一排第二端子 76、一排第三端子 86 及一排第四端子 96。

[0090] 该一排第一端子 66 一体设有一第一接触部 67、一第一延伸部 68、一固定部 69
及一第一接脚 610,该第一固定部 69 与该塑胶座体 30 固定,该第一延伸部 68 向舌片 50 前
端延伸,该第一接触部 67 连接于第一延伸部 68 前端,该第一延伸部 68 板面与第一接触部
67 板面平贴于该舌片 50 上面且与该舌片 50 上面齐平,该第一接触部 67 不弹动且位于该第
一端子 60 的第一接触部 61 前方。

[0091] 该一排第二端子 76、一排第三端子 86 及一排第四端子 96 在构造上则与该一排第
一端子 66 相同,该第二端子 76 的第二接触部 77 位于该第二端子 70 的第二接触部 71 前方,
该第三端子 86 的第三接触部 87 位于该第三端子 80 的第三接触部 81 前方,该第四端子 96
的第四接触部 97 位于该第四端子 90 的第四接触部 91 前方。

[0092] 请参阅图 18、图 19 及图 20,是本实用新型第八实施例,本实施例为一 USB2.0 和一
储存卡的共用插座,其包括一塑胶座体 30、一金属外壳 40、一舌片 50、一排第一端子 60、及
一排第二端子 70,其中;

[0093] 该塑胶座体 30 一体成型有一连接槽 31,其后端设有二排端子卡槽 32,另设有一后
盖 33 由下而上盖合,该连接槽 31 位于该塑胶座体 30 前段且前端设有一插入口 34,该连接
槽 31 的底部 36 不低于该整体连接槽 31 下方的塑胶座体的底面 37。

[0094] 该金属外壳 40 包覆该塑胶座体 30。

[0095] 该舌片 50 是与该塑胶座体 30 一体射出成型,该舌片 50 呈水平设于该塑胶座体 30
前端并位于该连接槽 31 内略偏下。

[0096] 该一排第一端子 60 共计 4 支呈间隔排列固定于该塑胶座体 30,其与第一实施例完
全相同,该第一端子 60 亦一体设有一第一接触部 61、一第一延伸部 62、一固定部 63 及
一第一接脚 64。

[0097] 该一排第二端子 70 与该一排第一端子 60 是为不相同连接介面,该一排第二端子
70 共计 5 支呈间隔排列固定于该塑胶座体 30,其一体设有一第二接触部 71、一第二延伸部
72、一固定部 73 及一第二接脚 74,该第二固定部 73 与该塑胶座体 30 上端的端子卡槽
32 固定,第二接触部 71 和第二延伸部 72 平贴于该连接槽 31 顶面,该一排第二接触部 71 不
会弹动并呈间隔排列位于该连接槽 31 顶面,该一排第二接触部 71 朝向该一排第一接触部
61。

[0098] 请参阅图 21,是为另一种储存卡 25 的三视图,其一端设有一接头 26,该接头 26 与
图 1 所示的储存卡 20 的接头 21 是为相同外型然连接介面不同,该接头 26 一面设有 5 个间

隔排列且会弹动的接点 27。

[0099] 请参阅图 22, 该 USB2.0 接头 10 的一排接点 11 朝下插入时, 其空间 14 为该舌片 50 所套入, 该一排接点 11 与舌片 50 上方的第一端子 60 的第一接触部 61 电连接, 由于该第二接触部 71 是平贴于连接槽 31 的顶面并未凸出, 故 USB2.0 接头 10 的金属外壳 13 不会碰触。

[0100] 请参阅图 23, 是为该储存卡 25 的使用状态, 当该接头 26 的一排接点 27 是朝上插接于该舌片 50 上方时是与该一排第二端子 70 的第二接触部 71 电连接。

[0101] 再者, 储存卡 20 的接点 22 朝下插接于该舌片 50 上方时则与该一排第一端子 60 的第一接触部 61 电连接。

[0102] 由以上的说明可知本实施例除了可连接 USB2.0 接头 10 外, 更可连接二种相同外型然连接介面不同相的储存卡 20、25, 达到使用上的多元性。

[0103] 请参阅图 24, 是本实用新型第九实施例, 其大致与第八实施例相同, 其差异在于本实施例的舌片 50 位于该连接槽 31 内略偏上, 该舌片 50 的下面设有一排第一端子 60, 该连接槽 31 的底面设有一排第二端子 70, 该一排第一端子 60 和一排第二端子 70 是为相同连接介面, 两者皆为一排 5 个间隔排列且与第八实施例的一排第二端子 70 是为相同构造, 该第一接触部 61 和该第二接触部 71 相面对。

[0104] 请参阅图 25, 本实施例可连接一与 USB2.0 接头 10 相同外型然不同连接介面的接头 15, 该接头 15 是设有一排 5 个可弹动的接点 16, 该接头 15 的接点 16 朝上插入该连接槽 31, 该接点 16 与与舌片 50 下方的第一端子 60 的第一接触部 61 电连接。

[0105] 请参阅图 26, 是为储存卡 25 的使用状态, 当该接头 26 的一排接点 27 朝上插接于该舌片 50 下方时是与该一排第一端子 60 的第一接触部 61 电连接; 当该接头 26 的一排接点 27 朝下插接于该舌片 50 下方时则与该一排第二端子 70 的第二接触部 71 电连接, 如此可达到正反双向电连接该储存卡 25。

[0106] 请参阅图 27、图 28、图 29 及图 30, 是为本实用新型第十实施例, 其大致与第一实施例相同, 其差异在于本实施例的位于舌片 50 上、下面的一排第一、三端子 60、80 是为相同连接介面, 两者皆为一排 4 个, 而位于连接槽 31 的顶、底面的一排第二、四端子 70、90 是为相同连接介面, 两者皆为一排 9 个。

[0107] 借由以上构造, 本实施例可正反双向电连接该 USB2.0 接头 10, 且可电连接一 9 个接点的储存卡及一 4 个接点的储存卡。

[0108] 请参阅图 31, 是本实用新型第十一实施例, 其大致与第十实施例相同, 其差异在于本实施例的连接槽 31 的上、下段设有宽度较大的宽槽 310, 而连接槽 31 的中段则设有宽度较小的窄槽 311, 如此可借以增加连接一种 9 个接点且宽薄型的储存卡。

[0109] 请参阅图 32 及图 33, 是本实用新型第十二实施例, 其大致与第十实施例相同, 其差异在于本实施例的一排第一、四端子 60、90 是为相同连接介面, 两者皆为一排 4 个, 而一排第二、三端子 70、80 是为相同连接介面, 两者皆为一排 9 个。

[0110] 本实施例在使用上则较第十实施例更为多元性, 除了第十实施例所述的三种外更可连接一与 USB2.0 接头 10 相同外型然而不同连接介面的接头, 该接头为 9 个接点者。

[0111] 在较佳实施例的详细说明中所提出的具体的实施例仅为了易于说明本实用新型的技术内容, 而并非将本实用新型狭义地限制于该实施例, 在不超出本实用新型的精神及

申请专利范围的情况,可作种种变化实施。

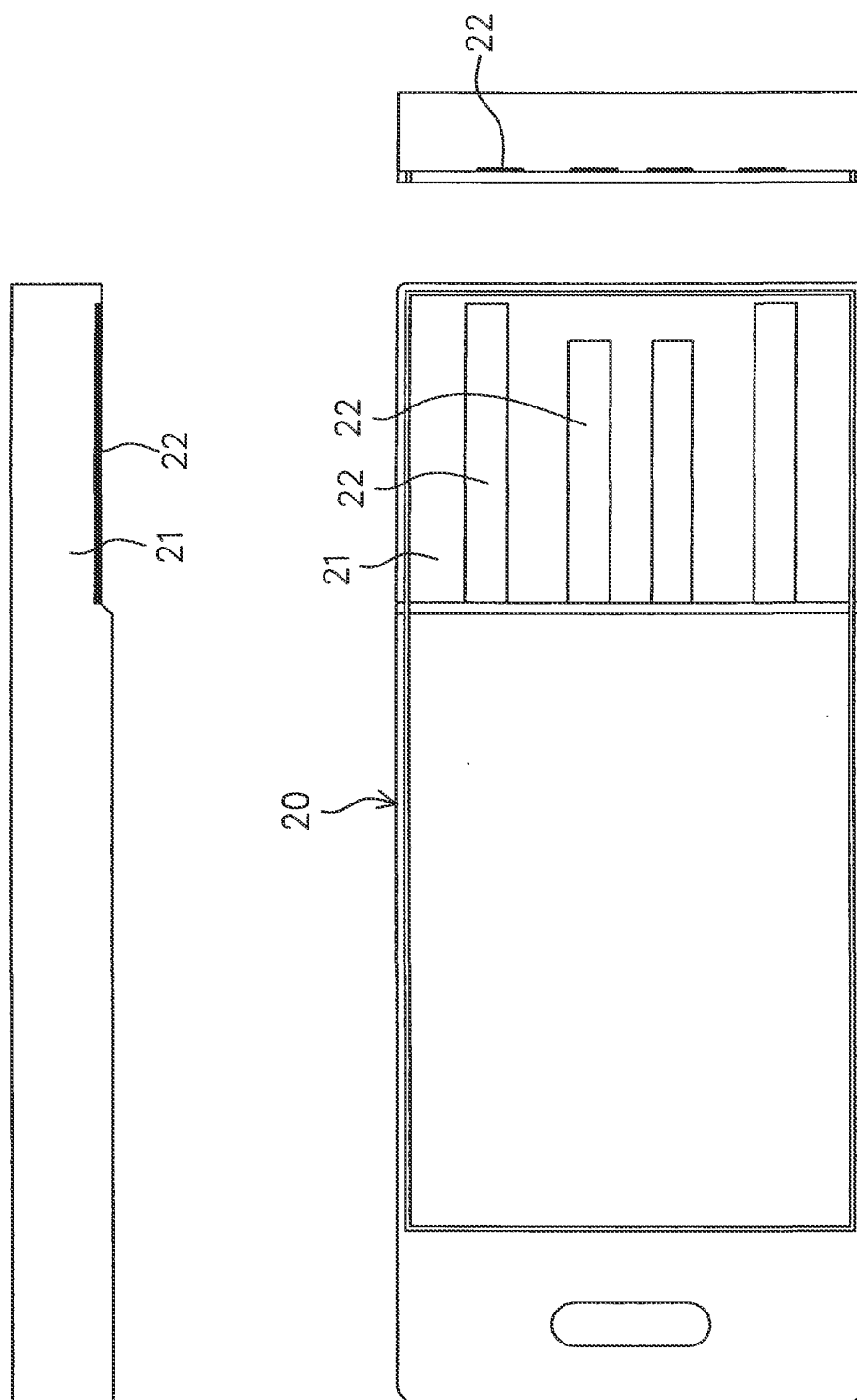


图 1

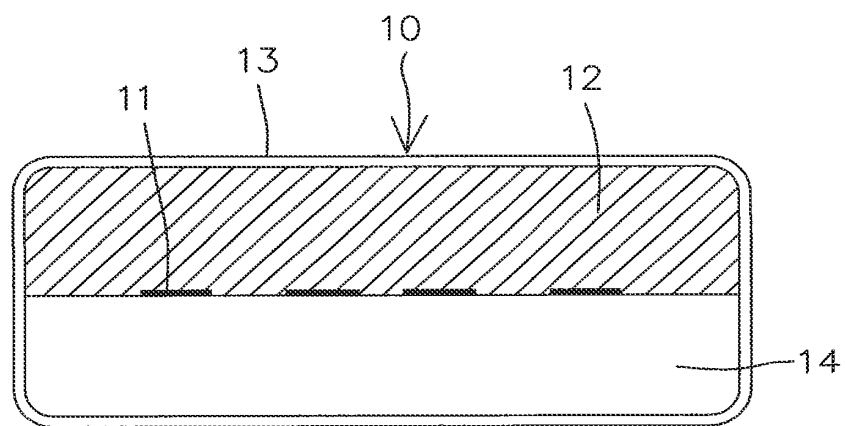


图 2

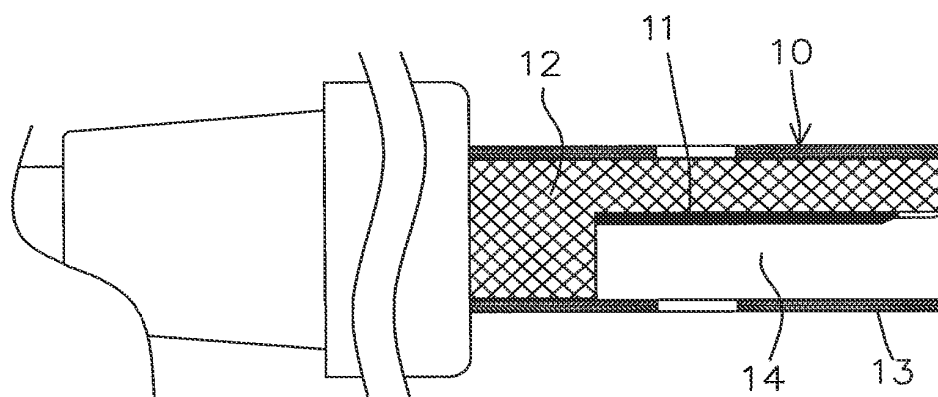


图 3

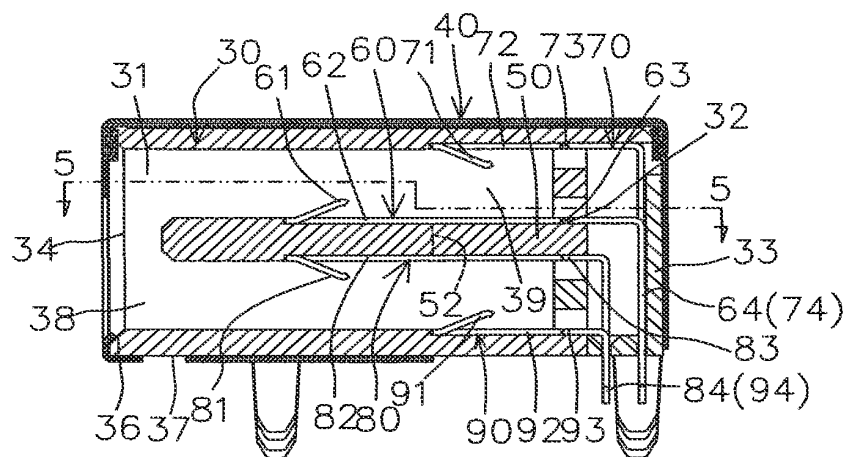


图 4

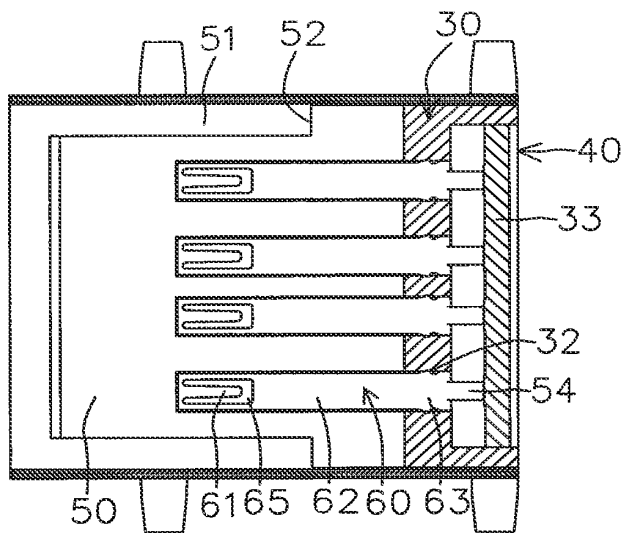


图 5

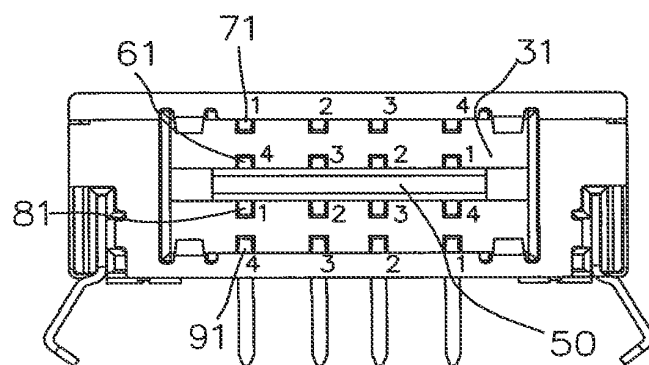


图 6

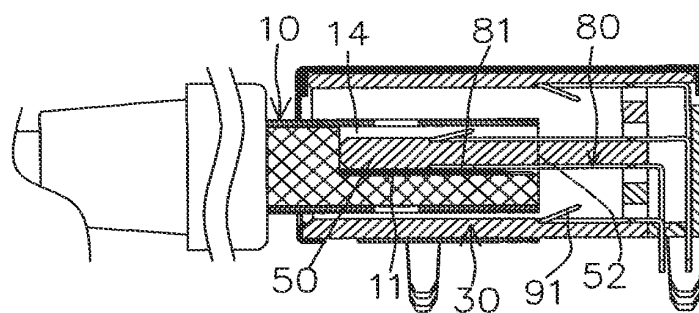


图 7

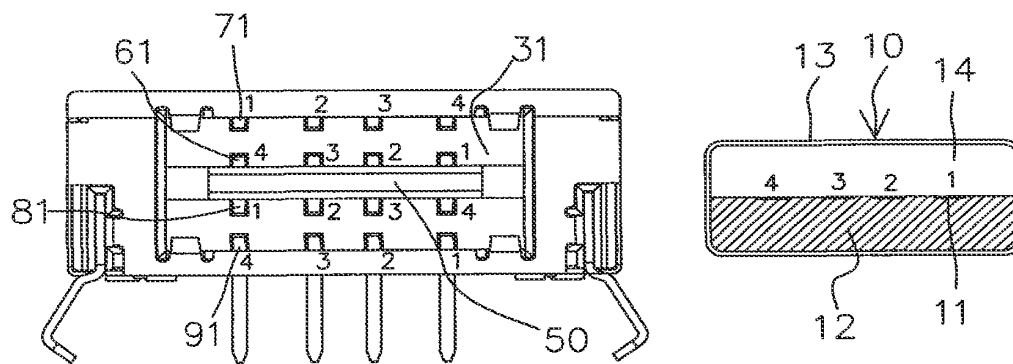


图 7A

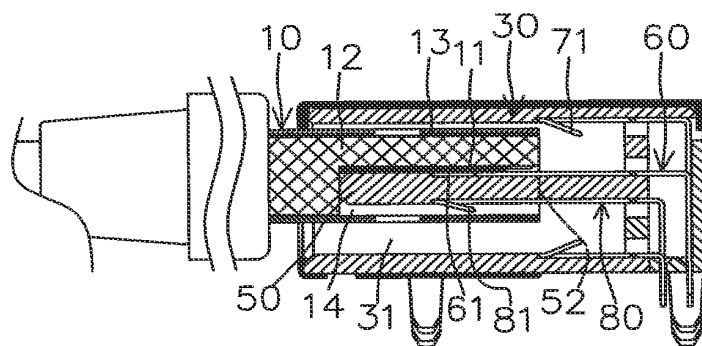


图 8

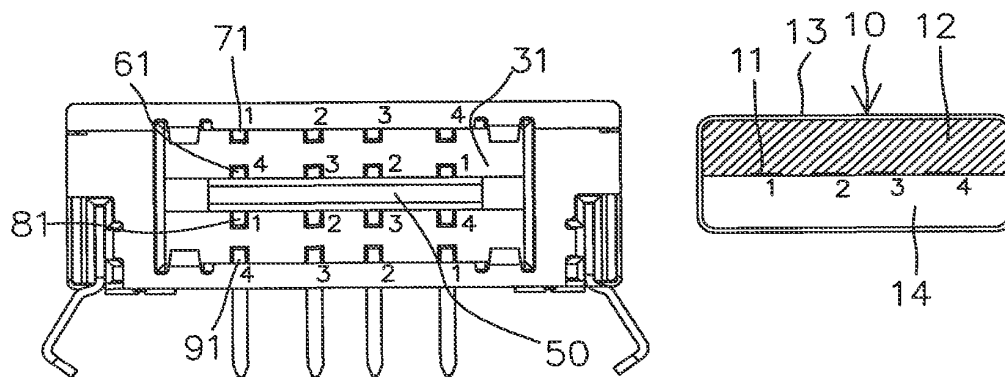


图 8A

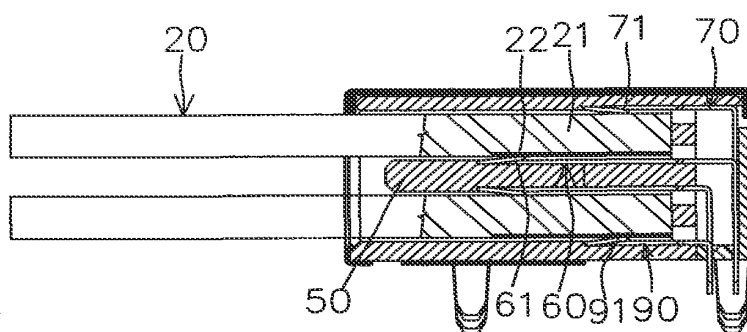


图 9

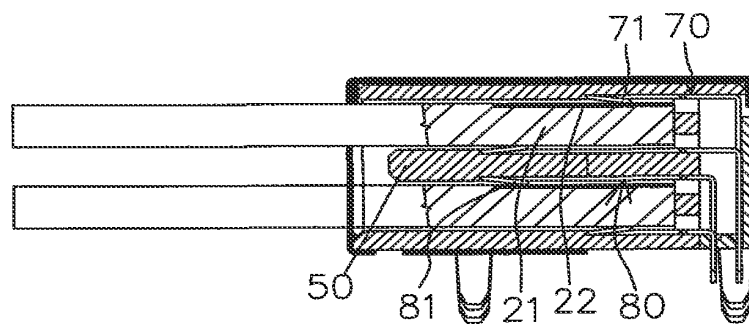


图 10

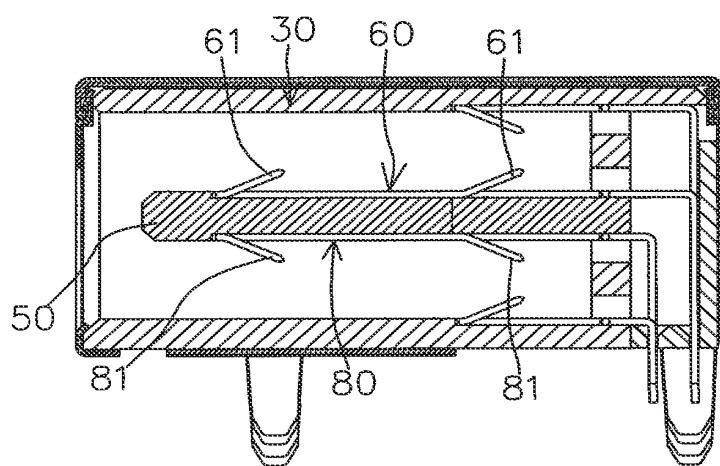


图 11

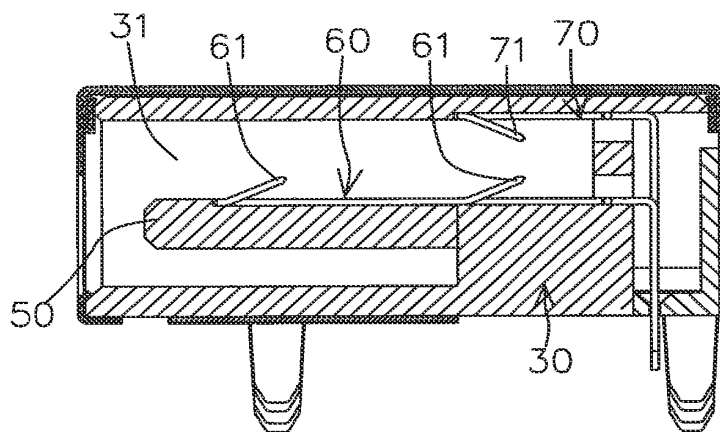


图 12

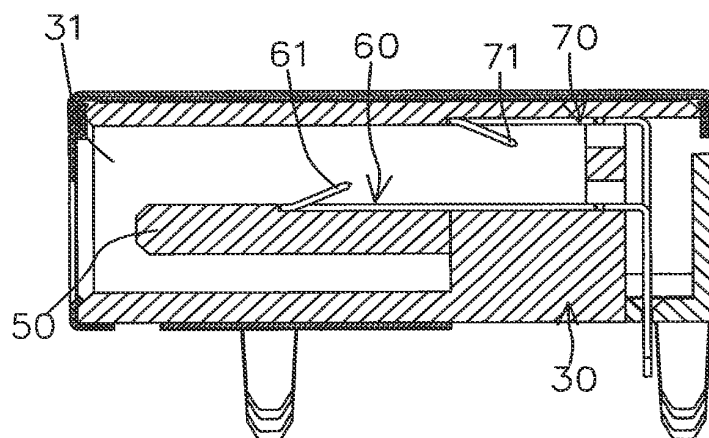


图 13

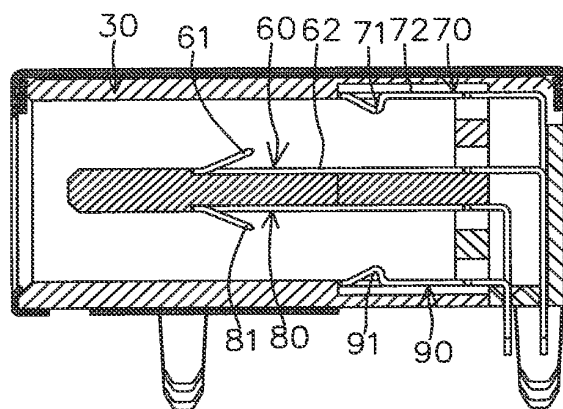


图 14

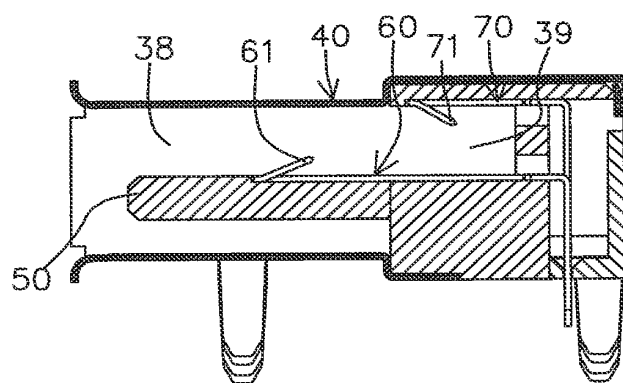


图 15

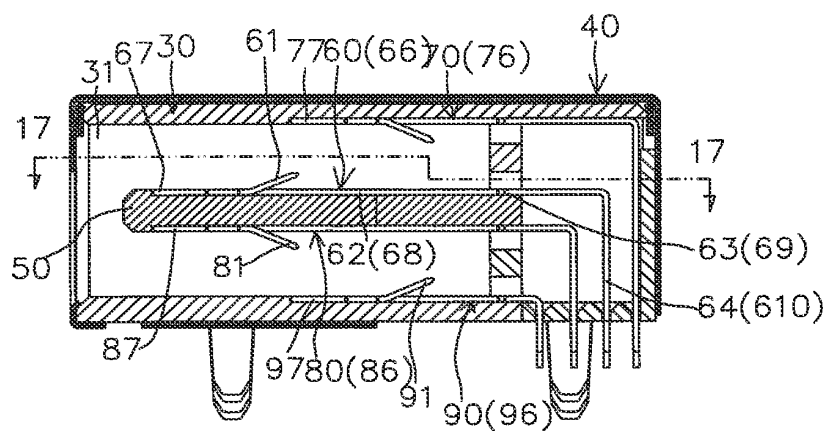


图 16

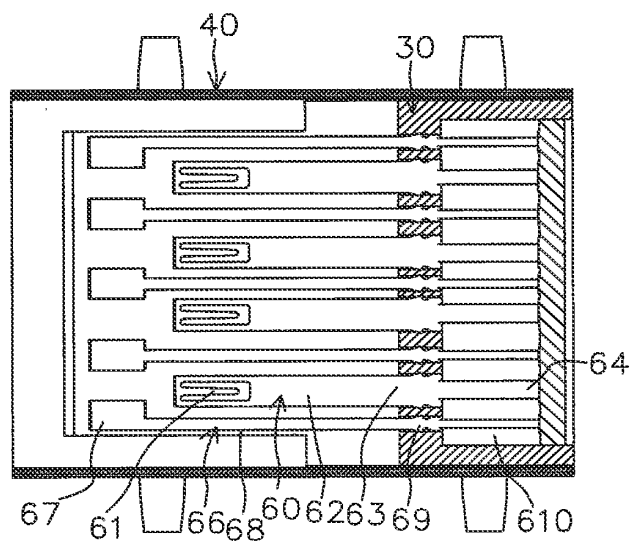


图 17

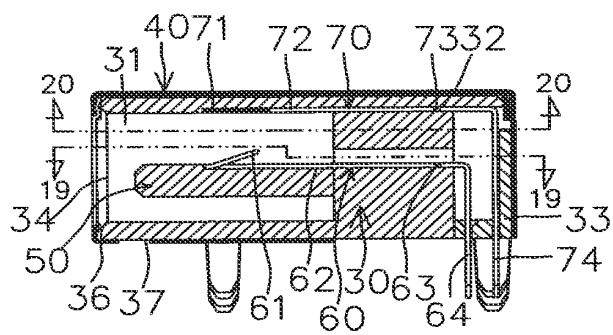


图 18

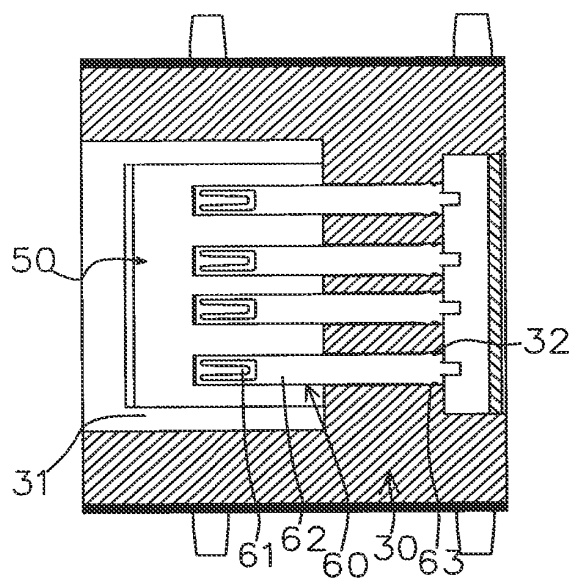


图 19

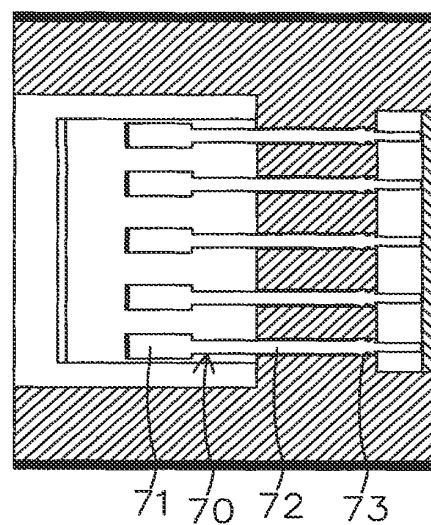


图 20

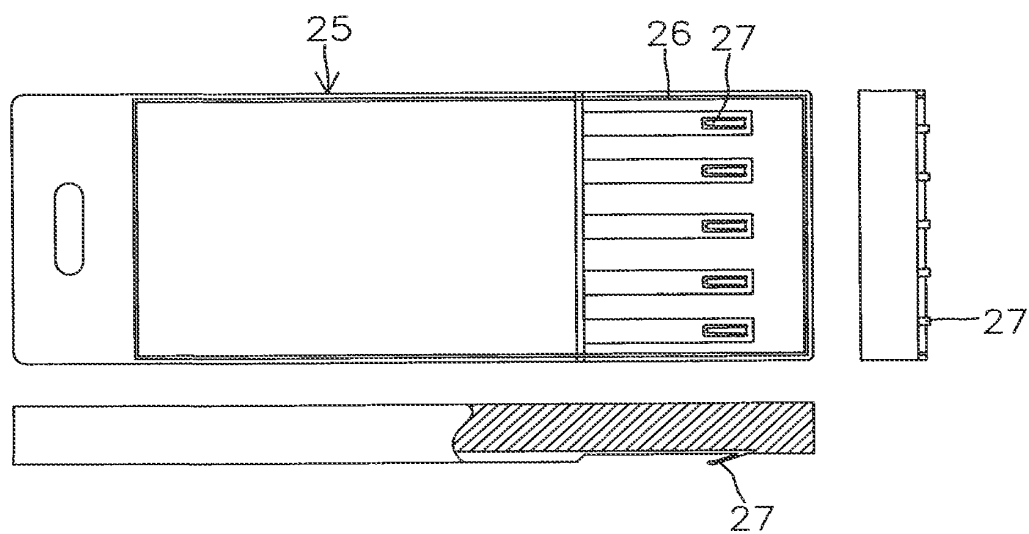


图 21

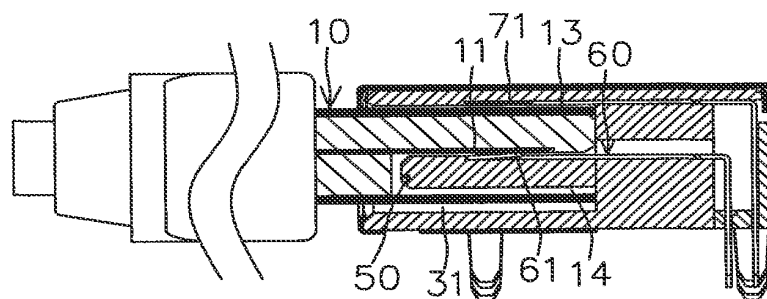


图 22

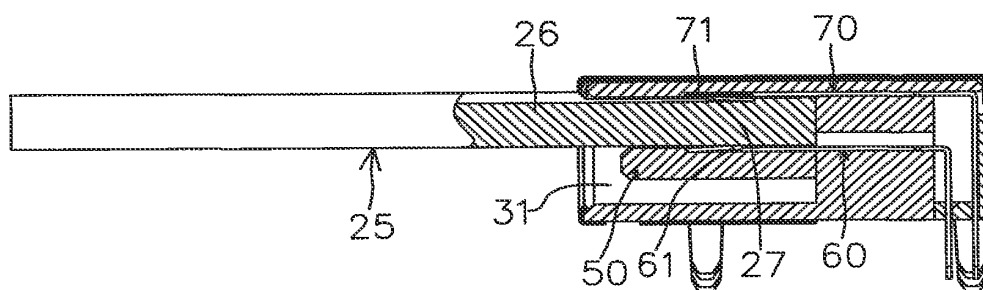


图 23

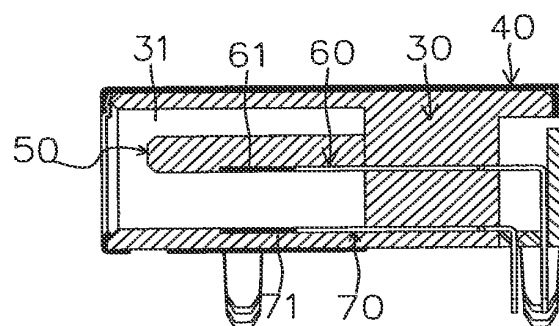


图 24

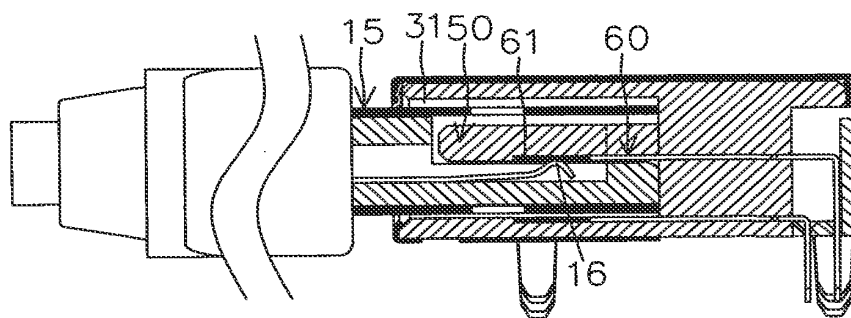


图 25

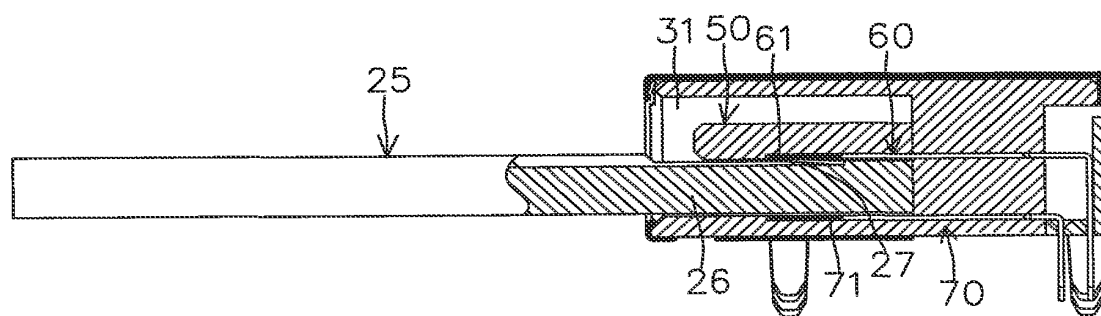


图 26

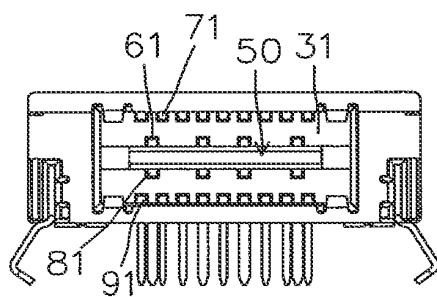


图 27

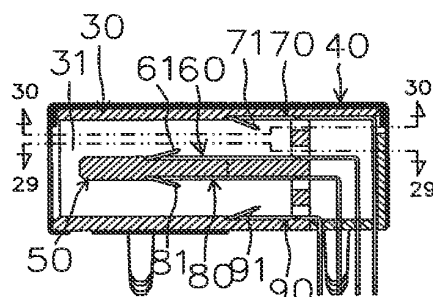


图 28

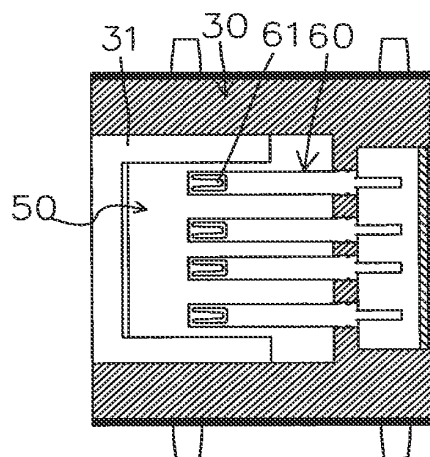


图 29

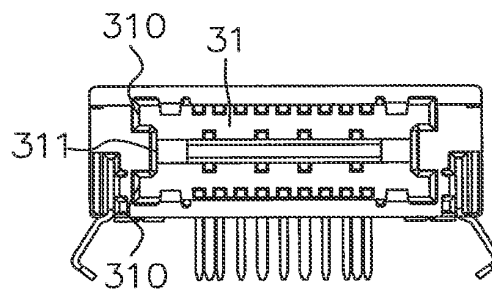


图 31

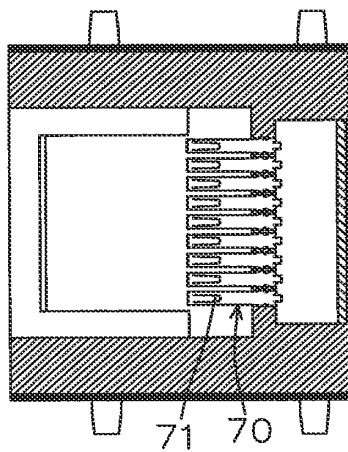


图 30

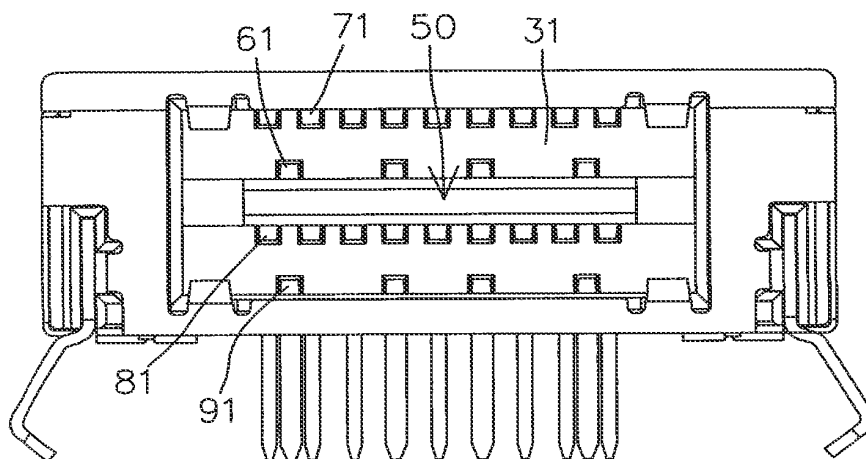


图 32

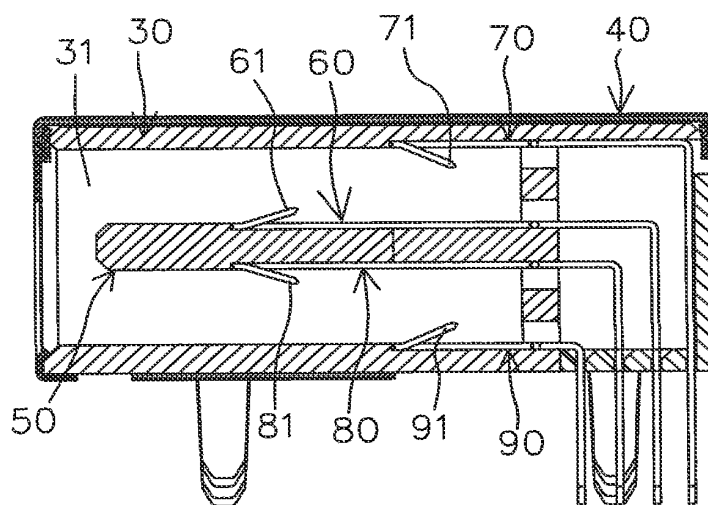
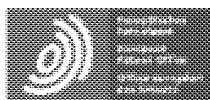


图 33



Espacenet

Bibliographic data: CN201682065 (U) — 2010-12-22

Plug connector and components of cable connector

Inventor(s): MURPHY R SHAWN; KLUGEMENS WAN; HAWARTH RICHARD;
NOSTLINGER CHRISTOPHER ± (R.SHAWN.MURPHY, ;
WAN.KLUGEMENS, ; RICHARD.HAWARTH, ;
CHRISTOPHER.NOSTLINGER)

Applicant(s): APPLE INC ± (APPLE INC)

Classification: - **international:** H01R12/71; H01R13/66
- **cooperative:** H01R12/7076 (EP, US); H01R12/716 (EP, US);
H01R13/504 (EP, US); H01R13/64 (EP, US);
H01R13/6658 (EP, US); H01R13/74 (EP, US)

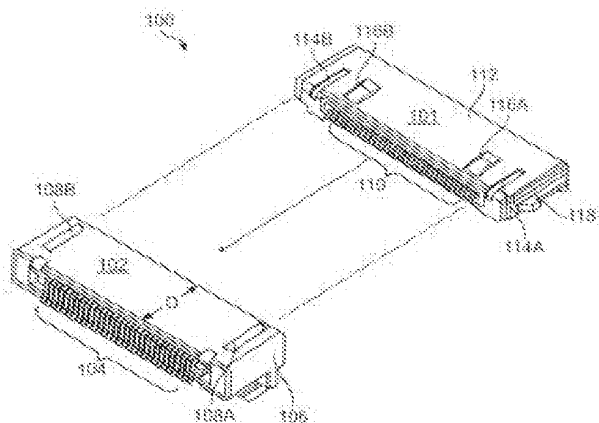
Application number: CN20092008369U 20080104

Priority number(s): US20070650330 20070105

Also published as: CN201233973 (Y) US2008166905 (A1) US2009209131 (A1) US7540788 (B2) US7632146 (B2) more

Abstract of CN201682065 (U)

The utility model provides a connector system. Various embodiments of connectors and connector assemblies provide modified structural features to meet evolving industrial design requirements while maintaining backward compatibility. In one embodiment, alignment posts on the two sides of a plug connector are substantially removed and the remaining connector shell reshaped so as to preserve alignment capability. Other pre-existing features such as alignment grooves and some or all springy raised tabs can be eliminated resulting in a more compact and monolithic structure for the connector without impacting functionality or backward compatibility. In another embodiment, a trim ring is molded to the base of the connector to form an integrated unit. The integrated unit results in a reduced size of the connector when it is incorporated into other devices such as a docking station; in yet another embodiment a printed circuit board is integrated into the boot of a connector assembly to act as an



intermediate connection mechanism between the cable wires and the connector pins. Other functionality such as identification circuitry or electrostatic discharge protection circuitry can be incorporated on to the integrated printed circuit board.



(12) 实用新型专利

(10) 授权公告号 CN 201682065 U

(45) 授权公告日 2010.12.22

(21) 申请号 200920008369.1

(51) Int. Cl.

(22) 申请日 2008.01.04

H01R 12/14 (2006.01)

(30) 优先权数据

H01R 13/66 (2006.01)

11/650,330 2007.01.05 US

(62) 分案原申请数据

200820006266.7 2008.01.04

(73) 专利权人 苹果公司

地址 美国加利福尼亚

(72) 发明人 R·肖恩·墨菲 温·克鲁吉门斯

理查德·豪沃思

克里斯托弗·斯特林格

(74) 专利代理机构 北京东方亿思知识产权代理

有限责任公司 11258

代理人 柳春雷 南霆

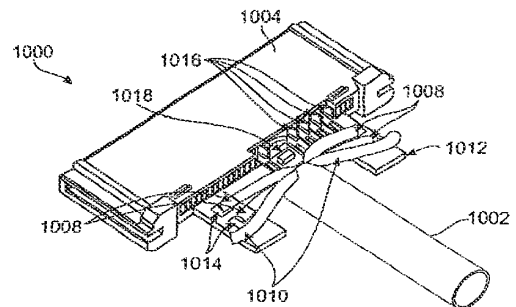
权利要求书 5 页 说明书 9 页 附图 5 页

(54) 实用新型名称

插头连接器及电缆连接器组件

(57) 摘要

本实用新型提供一种连接器系统。连接器和连接器组件的各个实施例提供了修改的结构特征以在保持向后兼容性的同时满足工业设计需要。将插头连接器两侧的对准柱完全去除并将剩余的连接器外壳重新成形以保持对准能力。诸如对准槽和弹性凸片的其它现有结构元件可被去除,这导致不影响功能或向后兼容性地得到更紧凑且单体的连接器结构。装饰环被塑造到连接器的基座上以形成一集成单元。该集成单元在被装入诸如系泊站的其它装置时导致尺寸减小的连接器。印刷电路板被集成到连接器组件的仓内以用作电缆导线和连接器针之间的中间连接机构。诸如识别电路或静电放电保护电路的其它功能可被加到集成的印刷电路板上。



1. 一种用于具有插座连接器的连接器系统中的插头连接器,所述插座连接器具有向插座连接器的盒形壳体内部突出的对准突起,其特征在于,所述插头连接器包括:

主体,该主体具有宽度为 W 的底板、宽度为比 W 小的 W' 的顶板、均具有容纳顶板和底板之间的宽度差的台阶的第一侧板和第二侧板,其中第一侧板和第二侧板相对于提供基本上平坦的主体的顶板和底板较小;和

电极阵列,该电极阵列沿所述主体的深度方向延伸并被绝缘材料定位到所述主体的底板的内表面上,从而在所述电极阵列和顶板之间的主体的内部留下插入空腔,

其中,所述第一侧板和第二侧板中的台阶与所述插座连接器的对准突起对准,以将插头连接器引导插入插座连接器壳体中。

2. 根据权利要求1所述的插头连接器,其特征在于,所述插头连接器还包括由卷绕插头连接器的导电材料的单板制成的外壳。

3. 根据权利要求1所述的插头连接器,其特征在于,所述插头连接器的每个侧板上的台阶具有弯曲边缘。

4. 根据权利要求1所述的插头连接器,其特征在于,所述电极阵列具有多达30针。

5. 根据权利要求1所述的插头连接器,其特征在于,所述插头连接器还包括塑造到插头连接器基座上的集成装饰环。

6. 根据权利要求5所述的插头连接器,其特征在于,所述装饰环由可耐受较高温度的材料制成。

7. 根据权利要求6所述的插头连接器,其特征在于,所述可耐受较高温度的材料是玻璃增强尼龙。

8. 根据权利要求5所述的插头连接器,其特征在于,具有集成装饰环的插头连接器被布置在印刷电路板上与垂直轴成预定的角度。

9. 根据权利要求8所述的插头连接器,其特征在于,所述预定的角度是偏离垂直轴约10度。

10. 一种包括根据权利要求1所述的插头连接器的电缆连接器组件,其特征在于,所述电缆连接器组件还包括:

容纳多个导线的电缆;

将电缆的第一端连接到插头连接器的仓,其中,通过集成到仓中的印刷电路板形成电缆内的所述多个导线和插头连接器内的所述电极阵列之间的电耦合;以及

位于印刷电路板上并与所述插头连接器的预定电极电耦合的电阻器。

11. 根据权利要求10所述的电缆连接器组件,其特征在于,所述印刷电路板包含适于接收来自电缆的相应的多个导线的多个焊盘。

12. 根据权利要求11所述的电缆连接器组件,其特征在于,所述印刷电路板还包含将所述多个焊盘与所述电极阵列的相应的多个接点电耦合的多个导电迹线。

13. 根据权利要求10所述的电缆连接器组件,其特征在于,所述电缆连接器组件还包括位于印刷电路板上并被配置为执行一个或更多个预定功能的一个或更多个电子部件。

14. 根据权利要求10所述的电缆连接器组件,其特征在于,布置在印刷电路板上的电阻器是用于识别电缆连接器的类型的电阻器。

15. 根据权利要求13所述的电缆连接器组件,其特征在于,所述电缆连接器组件还包

括布置在印刷电路板上并与所述插头连接器的一个或多个预定电极电耦合的静电放电保护电路。

16. 根据权利要求 10 所述的电缆连接器组件,其特征在于,所述电缆的第二端与通用串行总线连接器耦合。

17. 根据权利要求 14 所述的电缆连接器组件,其特征在于,所述电阻器被电耦合在两个预定电极之间。

18. 根据权利要求 17 所述的电缆连接器组件,其特征在于,所述电极阵列至少包括 30 个以行布置的针,并且所述电阻器被耦合在编号 10 的电极和接地电极之间。

19. 根据权利要求 10 所述的电缆连接器组件,其特征在于,所述多个导线包括用于通用串行总线连接的四个导线。

20. 根据权利要求 10 所述的电缆连接器组件,其特征在于,所述电缆包括一个或多个被配置用于提供电屏蔽的网状编带。

21. 根据权利要求 10 所述的电缆连接器组件,其特征在于,所述印刷电路板是括弧的形状,具有适于接收电缆的开口。

22. 根据权利要求 13 所述的电缆连接器组件,其特征在于,所述电缆连接器组件还包括布置在印刷电路板上的电磁干扰 EMI 抑制装置。

23. 根据权利要求 10 所述的电缆连接器组件,其特征在于,所述电缆包括适于增加 EMI 吸收的铁素体包覆。

24. 一种用于具有插座连接器的连接器系统中的插头连接器,所述插座连接器具有向插座连接器的盒形壳体内部突出的对准突起,其特征在于,所述插头连接器包括:

主体,该主体具有宽度为 W 的底板、宽度为比 W 小的 W' 的顶板、均具有容纳顶板和底板之间的宽度差的台阶的第一侧板和第二侧板,其中第一侧板和第二侧板相对于提供基本上平坦的主体的顶板和底板较小;和

位于所述主体内的多个电极,所述多个电极包括沿所述主体的深度方向延伸并被绝缘材料定位到所述主体的底板的内表面上的单行电极,从而在所述单行电极和顶板之间的主体的内部留下插入空腔,其中所述主体内的所有电极都在单个行中,

其中,所述第一侧板和第二侧板中的台阶与所述插座连接器的对准突起对准,以将插头连接器引导插入插座连接器壳体中。

25. 根据权利要求 24 所述的插头连接器,其特征在于,所述插头连接器还包括由卷绕插头连接器的导电材料的单板制成的外壳。

26. 根据权利要求 24 所述的插头连接器,其特征在于,所述插头连接器的每个侧板上的台阶具有弯曲边缘。

27. 根据权利要求 24 所述的插头连接器,其特征在于,所述电极阵列具有多达 30 针。

28. 根据权利要求 24 所述的插头连接器,其特征在于,所述插头连接器还包括塑造到插头连接器基座上的集成装饰环。

29. 根据权利要求 28 所述的插头连接器,其特征在于,所述装饰环由可耐受较高温度的材料制成。

30. 根据权利要求 29 所述的插头连接器,其特征在于,所述可耐受较高温度的材料是玻璃增强尼龙。

31. 根据权利要求 26 所述的插头连接器,其特征在于,具有集成装饰环的插头连接器被布置在印刷电路板上与垂直轴成预定的角度。

32. 根据权利要求 31 所述的插头连接器,其特征在于,所述预定的角度是偏离垂直轴约 10 度。

33. 根据权利要求 24 所述的插头连接器,其特征在于,使用单行电极提供了厚度减小的插头连接器。

34. 根据权利要求 24 所述的插头连接器,其特征在于,所述单行电极包括 30 个电极。

35. 根据权利要求 24 所述的插头连接器,其特征在于,所述顶板、底板、第一侧板和第二侧板都是由单片导电材料形成的。

36. 根据权利要求 35 所述的插头连接器,其特征在于,所述导电材料的单板形成至少一个框架接点。

37. 根据权利要求 28 所述的插头连接器,其特征在于,所述插头连接器被包含在系泊于系泊表面上的手持式电子装置中,所述装饰环和所述插头连接器的尺寸被选择为:当所述手持式电子装置被系泊时,在所述手持式电子装置的底部与所述系泊表面之间产生间隙。

38. 一种包括根据权利要求 24 所述的插头连接器的电缆连接器组件,其特征在于,所述电缆连接器组件还包括:

容纳多个导线的电缆;

将电缆的第一端连接到插头连接器的仓,其中,通过集成到仓中的印刷电路板形成电缆内的所述多个导线和插头连接器主体内的所述单行电极之间的电耦合;以及

位于印刷电路板上并与所述插头连接器的预定电极电耦合的电阻器。

39. 根据权利要求 38 所述的电缆连接器组件,其特征在于,所述印刷电路板包含适于接收来自电缆的相应的多个导线的多个焊盘。

40. 根据权利要求 39 所述的电缆连接器组件,其特征在于,所述印刷电路板还包含将所述多个焊盘与所述单行电极的相应的多个接点电耦合的多个导电迹线。

41. 根据权利要求 38 所述的电缆连接器组件,其特征在于,所述电缆连接器组件还包括位于印刷电路板上并被配置为执行一个或更多个预定功能的一个或更多个电子部件。

42. 根据权利要求 38 所述的电缆连接器组件,其特征在于,布置在印刷电路板上的电阻器是用于识别电缆连接器的类型的电阻器。

43. 根据权利要求 41 所述的电缆连接器组件,其特征在于,所述电缆连接器组件还包括布置在印刷电路板上并与所述插头连接器的一个或多个预定电极电耦合的静电放电保护电路。

44. 根据权利要求 38 所述的电缆连接器组件,其特征在于,所述电缆的第二端与通用串行总线连接器耦合。

45. 根据权利要求 42 所述的电缆连接器组件,其特征在于,所述电阻器被电耦合在两个预定电极之间。

46. 根据权利要求 45 所述的电缆连接器组件,其特征在于,所述单行电极至少包括 30 个以行布置的针,并且所述电阻器被耦合在编号 15 的电极和接地电极之间。

47. 根据权利要求 38 所述的电缆连接器组件,其特征在于,所述多个导线包括用于通

用串行总线连接的四个导线。

48. 根据权利要求 38 所述的电缆连接器组件,其特征在于,所述电缆包括一个或多个被配置用于提供电屏蔽的网状编带。

49. 根据权利要求 38 所述的电缆连接器组件,其特征在于,所述印刷电路板是括弧的形状,具有适于接收电缆的开口。

50. 根据权利要求 41 所述的电缆连接器组件,其特征在于,所述 电缆连接器组件还包括布置在印刷电路板上的电磁干扰 EMI 抑制装置。

51. 根据权利要求 38 所述的电缆连接器组件,其特征在于,所述电缆包括适于增加 EMI 吸收的铁素体包覆。

52. 一种插头连接器,其特征在于,所述插头连接器包括:

由单片导电材料形成的连接器外壳,所述连接器外壳具有宽度为 W 的底部、宽度为比 W 小的 W' 的顶部、均具有容纳顶部和底部之间的宽度差的台阶的第一侧部和第二侧部;

位于所述连接器外壳底部内的绝缘材料,从而在所述绝缘材料和所述连接器外壳的顶部之间形成插入空腔;以及

位于所述连接器外壳中的单行针,所述单行针被绝缘材料定位到所述连接器外壳的底部内,从而所述针只在沿所述插入空腔的底侧出现,

其中,使所有针位于单个行中使得所述连接器外壳基本平坦。

53. 根据权利要求 52 所述的插头连接器,其特征在于,所述单行针包括 30 针。

54. 根据权利要求 52 所述的插头连接器,其特征在于,所述连接器外壳形成至少一个框架接点。

55. 根据权利要求 52 所述的插头连接器,其特征在于,所述连接器外壳包括至少一个凸片。

56. 一种插头连接器,其特征在于,所述插头连接器包括:

主体,该主体具有第一宽度的底板、宽度为比第一宽度小的第二宽度的顶板、均具有容纳顶板和底板之间的宽度差的台阶的第一侧板和第二侧板,其中第一侧板和第二侧板相对于提供基本上平坦的主体的顶板和底板较小;和

位于所述主体内的多个电极,所述多个电极包括沿主体的深度方向延伸的单行电极并被绝缘材料定位到主体的底板的内表面上,从而在所述单行电极和顶板之间的主体的内部留下插入空腔,其中所述主体内的所有电极位于所述单行中,

其中,从插入空腔的顶侧延伸到所述顶板内表面的区域没有电极。

57. 根据权利要求 56 所述的插头连接器,其特征在于,所述单行电极包括 30 个电极。

58. 根据权利要求 56 所述的插头连接器,其特征在于,所述顶板、底板、第一侧板和第二侧板由单片导电材料形成。

59. 根据权利要求 58 所述的插头连接器,其特征在于,所述单片导电材料形成至少一个框架接点。

60. 一种插头连接器,其特征在于,所述插头连接器包括:

主体,该主体具有宽度为 W 的底板、宽度为比 W 小的 W' 的顶板、均具有容纳顶板和底板之间的宽度差的台阶的第一侧板和第二侧板,其中第一侧板和第二侧板相对于提供基本上平坦的主体的顶板和底板较小;和

位于所述主体内的多个电极,所述多个电极包括单行电极,每个电极具有单个倒钩,所述电极在所述主体的深度方向上延伸并被绝缘材料定位到主体的底板的内表面上,从而在所述单行电极和顶板之间的主体的内部留下插入空腔,其中所述主体内的所有电极位于所述单行中,

其中所述第一侧板和第二侧板中的台阶与插座连接器的对准突起对准,以将插头连接器引导插入插座连接器中。

61. 根据权利要求 60 所述的插头连接器,其特征在于,所述单行电极包括 30 个电极。

62. 根据权利要求 60 所述的插头连接器,其特征在于,所述顶板、底板、第一侧板和第二侧板由单片导电材料形成。

63. 根据权利要求 62 所述的插头连接器,其特征在于,所述单片导电材料形成至少一个框架接点。

插头连接器及电缆连接器组件

[0001] 本申请是申请日为 2008 年 1 月 4 日,申请号为“2008200062667”、实用新型名称为“向后兼容的连接器系统”的分案申请。

[0002] 对相关申请的交叉引用

[0003] 本申请与发明名称为“Connector”的美国专利 No. 6776660、在 2004 年 4 月 27 日提交的发明名称为“Connector Interface System for Multi-Communication Device”的共同受让的专利申请 No. 10/833689 (20750P-000500US/P3393US1) 以及在 2003 年 4 月 25 日提交的发明名称为“Media Player System”的共同受让的专利申请 No. 10/423490 (20750P-000900US/P3032US1) 有关,通过引用将其全部并入于此。

[0004] 技术领域

[0005] 本实用新型一般涉及用于电子系统的连接器。更具体地说,本实用新型涉及将便携式或手持式装置连接到其它电子装置的连接器系统的各种实现及制造方法。

[0006] 背景技术

[0007] 最近五年见证了诸如移动电话、数字媒体播放器、个人数字助理等的手持式消费电子装置的迅速增涨。使得能够在这些装置和诸如主计算机、附件和电源的其它电子系统之间进行电互连的连接器技术已得到发展,以满足这些系统的从电气规范和接口协议到形状因子 (form factor) 的各种要求。可以在 30 针连接器平台中发现高度通用的连接器系统的好例子,在上面提到的已授权专利和待决专利申请中说明了该 30 针连接器平台的各个方面。已开发了包含该 30 针连接器平台作为用于提供电互连性的主要装置的一大批电子装置。随着行业的发展,为了与现有装置对接和一起工作,随后的用于新老应用的装置的产生依赖于连接器平台的向后兼容性。另一方面,特别是在手持式消费电子装置市场中,曾经存在的减小电子装置尺寸或者出于其它工业设计考虑而另外修改其结构的需求常常要求重新设计包含连接器的装置的许多方面。因此,需要能够应对由这些竞争的需求提出的挑战的改进的连接器系统。

[0008] 实用新型内容

[0009] 本实用新型的各个实施例提供了具有更紧凑且单体的设计同时保持了向后兼容性的改进的连接器系统。在一个实施例中,将插头连接器的两侧的对准柱完全去除并将剩余的连接器外壳重新成形以保持对准能力。在一个实施例中,重新成形的连接器包含由卷绕连接器从而形成单个接缝的导电材料的单板制成的外壳。诸如对准槽和一些或所有弹性凸片的其它现有结构元件 (feature) 可被去除,这导致不影响功能或向后兼容性地得到更紧凑且单体的连接器结构。在另一实施例中,装饰环 (trina ring) 被塑造到连接器的基座上以与连接器形成一集成单元。该集成单元在被装入诸如系泊站 (docking station) 的其它装置时导致尺寸减小的连接器。在又一实施例中,印刷电路板被集成到连接器组件的仓内以用作电缆导线和连接器针之间的中间连接机构。诸如识别电路或静电放电保护电路的其它功能可被加到集成的印刷电路板上。

[0010] 因此,在一个实施例中,本实用新型提供了一种用于具有插座连接器的连接器系统中的插头连接器,该插座连接器具有向插座连接器的盒形壳体内突出的对准突起,该插

头连接器包括：主体，该主体具有宽度为 W 的底板、宽度为比 W 小的 W' 的顶板、均具有容纳顶板和底板之间的宽度差的台阶的第一侧板和第二侧板，其中第一侧板和第二侧板相对于提供基本上平坦的主体的顶板和底板较小；和电极阵列，该电极阵列沿主体的深度方向延伸并被绝缘材料定位到主体的底板的内表面上，从而在电极阵列和顶板之间的主体的内部留下插入空腔，其中第一侧板和第二侧板中的台阶与插座连接器的对准突起对准，以将插头连接器引导插入插座连接器壳体中。插头连接器还包含由卷绕主体的导电材料的单板制成的外壳。

[0011] 在另一实施例中，插头连接器还包含塑造到插头连接器的基座上的集成装饰环。在一特定实施例中，该集成装饰环由玻璃增强尼龙制成。在另一实施例中，减少将插头连接器内的电极保持在适当位置的倒钩的数量。

[0012] 在又一实施例中，本实用新型将印刷电路板集成到电缆连接器组件的仓内。在该实施例中，电缆中的导线通过印刷电路板与连接器电极电耦合。在一特定实施例中，印刷电路板还包含诸如识别电路或静电放电保护电路的附加功能。

[0013] 在一个实施例中，本实用新型提供了一种用于具有插座连接器的连接器系统中的插头连接器，所述插座连接器具有向插座连接器的盒形壳体内部突出的对准突起，其特征在于，所述插头连接器包括：主体，该主体具有宽度为 W 的底板、宽度为比 W 小的 W' 的顶板、均具有容纳顶板和底板之间的宽度差的台阶的第一侧板和第二侧板，其中第一侧板和第二侧板相对于提供基本上平坦的主体的顶板和底板较小；电极阵列，该电极阵列沿所述主体的深度方向延伸并被绝缘材料定位到所述主体的底板的内表面上，从而在所述电极阵列和顶板之间的主体的内部留下插入空腔，其中，所述第一侧板和第二侧板中的台阶与所述插座连接器的对准突起对准，以将插头连接器引导插入插座连接器壳体中。

[0014] 在一个实施例中，本实用新型提供了一种包括上述插头连接器的电缆连接器组件，其特征在于，所述电缆连接器组件还包括：容纳多个导线的电缆；将电缆的第一端连接到插头连接器的仓，其中，通过集成到仓中的印刷电路板形成电缆内的所述多个导线和插头连接器内的所述电极阵列之间的电耦合；位于印刷电路板上并与所述插头连接器的预定电极电耦合的电阻器。

[0015] 在一个实施例中，本实用新型提供了一种用于具有插座连接器的连接器系统中的插头连接器，所述插座连接器具有向插座连接器的盒形壳体内部突出的对准突起，其特征在于，所述插头连接器包括：主体，该主体具有宽度为 W 的底板、宽度为比 W 小的 W' 的顶板、均具有容纳顶板和底板之间的宽度差的台阶的第一侧板和第二侧板，其中第一侧板和第二侧板相对于提供基本上平坦的主体的顶板和底板较小；位于所述主体内的多个电极，所述多个电极包括沿所述主体的深度方向延伸并被绝缘材料定位到所述主体的底板的内表面上的单行电极，从而在所述单行电极和顶板之间的主体的内部留下插入空腔，其中所述主体内的所有电极都在单个行中，其中，所述第一侧板和第二侧板中的台阶与所述插座连接器的对准突起对准，以将插头连接器引导插入插座连接器壳体中。

[0016] 在一个实施例中，本实用新型提供了一种包括上述插头连接器的电缆连接器组件，其特征在于，所述电缆连接器组件还包括：容纳多个导线的电缆；将电缆的第一端连接到插头连接器的仓，其中，通过集成到仓中的印刷电路板形成电缆内的所述多个导线和插头连接器主体内的所述单行电极之间的电耦合；位于印刷电路板上并与所述插头连接器的

预定电极电耦合的电阻器。

[0017] 在一个实施例中,本实用新型提供了一种插头连接器,其特征在于,所述插头连接器包括:由单片导电材料形成的连接器外壳,所述连接器外壳具有宽度为 W 的底部、宽度为比 W 小的 W' 的顶部、均具有容纳顶部和底部之间的宽度差的台阶的第一侧部和第二侧部;位于所述连接器外壳底部内的绝缘材料,从而在所述绝缘材料和所述连接器外壳的顶部之间形成插入空腔;位于所述连接器外壳中的单行针,所述单行针被绝缘材料定位到所述连接器外壳的底部内,从而所述针只在沿所述插入空腔的底侧出现,其中,使所有针位于单个行中使得所述连接器外壳基本平坦。

[0018] 在一种实施例中,本实用新型提供了一种插头连接器,其特征在于,所述插头连接器包括:主体,该主体具有第一宽度的底板、宽度为比第一宽度小的第二宽度的顶板、均具有容纳顶板和底板之间的宽度差的台阶的第一侧板和第二侧板,其中第一侧板和第二侧板相对于提供基本上平坦的主体的顶板和底板较小;位于所述主体内的多个电极,所述多个电极包括沿主体的深度方向延伸的单行电极并被绝缘材料定位到主体的底板的内表面上,从而在所述单行电极和顶板之间的主体的内部留下插入空腔,其中所述主体内的所有电极位于所述单行中,其中,从插入空腔的项侧延伸到所述顶板内表面的区域没有电极。

[0019] 在一种实施例中,本实用新型提供了一种插头连接器,其特征在于,所述插头连接器包括:主体,该主体具有宽度为 W 的底板、宽度为比 W 小的 W' 的顶板、均具有容纳顶板和底板之间的宽度差的台阶的第一侧板和第二侧板,其中第一侧板和第二侧板相对于提供基本上平坦的主体的顶板和底板较小;位于所述主体内的多个电极,所述多个电极包括单行电极,每个电极具有单个倒钩,所述电极在所述主体的深度方向上延伸并被绝缘材料定位到主体的底板的内表面上,从而在所述单行电极和顶板之间的主体的内部留下插入空腔,其中所述主体内的所有电极位于所述单行中,其中所述第一侧板和第二侧板中的台阶与插座连接器的对准突起对准,以将插头连接器引导插入插座连接器中。

[0020] 修改的连接器的这些和其它特征产生了保持与先前存在的相配连接器兼容的更紧凑且单体的连接器组件。以下的详细说明和附图使得可以更好地理解本实用新型的连接器的本质和优点。

[0021] 附图说明

[0022] 图 1 示出了插头连接器和插座连接器的等距视图以及这两个连接器的连接方式;

[0023] 图 2 和图 3 分别示出了现有插头连接器的简化顶视图和截面图;

[0024] 图 4 提供了根据本实用新型的一个实施例的经修改但向后兼容的插头连接器的前视截面图;

[0025] 图 5A 和图 5B 示出了根据本实用新型的一个实施例的经修改但向后兼容的插头连接器的正面和背面的等距视图;

[0026] 图 6 提供了现有系泊系统的部件的子集的立体图;

[0027] 图 7A 和图 7B 分别示出了具有放在其基座上的保护环的连接器和放在印刷电路板上时的该连接器的侧视图;

[0028] 图 8A 和图 8B 分别提供了根据本实用新型的实施例的集成的连接器加保护环的背面和正面的等距视图;

[0029] 图 9A 和图 9B 分别示出了根据本实用新型的另一实施例的集成的连接器加保护

环、以及经修改的针形状的侧视图；以及

[0030] 图 10A 和图 10B 分别示出了具有集成到连接器的仓中的印刷电路板的连接器组件的实施例和完全组装的连接器。

[0031] 具体实施方式

[0032] 参照图 1, 该图示出了包含诸如 iPod™ 的手持式媒体播放器的一大批电子装置和为这些手持式媒体播放器开发的许多附件当前所使用的连接器系统 100。连接器系统 100 包含可插入插座连接器 102 中的插头连接器 101。这些连接器被设计为：当处于接合位置时，容纳于插头连接器 101 中的针阵列 110 与容纳于插座连接器 102 中的相应针阵列 104 接触。为了在插入过程中适当地对准这两个针阵列，插座连接器 102 包含从其外壳向内突出的一对突起 108A 和 108B。在一个实施例中，通过将连接器外壳的顶板切割成带角度的 C（或括弧）形状并将得到的舌片向插头壳体内部弯曲，从而形成突起 108A 和 108B。插头连接器 101 继而包含相应的一对槽或狭缝 114A 和 114B，当与插座连接器 102 接触时，该对槽或狭缝 114A 和 114B 与突起 108A 和 108B 啮合并帮助引导插入过程。

[0033] 在一些实施例中，插头连接器 101 包含这样的外壳或框架（chassis），该外壳或框架具有由导电材料制成以在连接器承载电信号时减少电磁干扰（EMI）的顶板和底板。插头连接器 101 还包含凸起的弹性凸片 116A 和 116B，其增加了两个接合连接器之间的压缩作用从而使啮合更牢固并进一步改善了 EMI 抑制。在其它的实施例中，插头连接器 101 还在插头连接器主体的任一侧包含诸如弹性止动销 118 的锁止机构。当被插入插座连接器 102 中时，止动销 118 首先被推入，然后在插座连接器主体内部被一次释放从而锁住这两个连接器。

[0034] 图 2 和图 3 分别提供了插头连接器 101 的示例性顶视图和截面图。在示出的实施例中，插头连接器 101 包含连接器壳体侧面上的对准柱 122A 和 122B。在本实施例中，顶板 120 以及凸片 116A 和 116B 由诸如金属的导电材料制成，而对准柱 122A 和 122B 由诸如塑料树脂的非导电材料制成。图 3 中的插头连接器 101 的前视截面图示出了电介质材料底座（bed）中的固定到连接器壳体的下板内壁上的针阵列 110，从而在连接器内部的剩余部分中留下了空腔 124。在一个实施例中，电介质材料底座可容纳 30 针。在表一中示出了如在 iPod™ 媒体播放器中使用的针对 30 针加两个框架接地凸片或针的示例性针指定。虽然电介质底座可容纳 30 针，但在电介质底座中包含的导电针的实际数量可根据应用而改变。此外，框架针的数量可少于或多于表一列出的两个。在一个例子中，多达六个的框架针为连接器外壳以及通过焊接到板上而使连接器物理紧固的机构提供接地。图 3 还示出了连接器壳体的两侧上的一对弹性凸片 116。该特定的连接器 101 在从对准柱 118 的外边缘开始测量时为约 21.30mm 宽，而在不包括对准柱 122 时为约 19.2mm 宽。在上述的美国专利 No. 6776660 和待决专利申请 No. 10/833689 和 No. 10/423490 中提供连接器系统 100 的示例性实施例的其它结构和电气细节，通过引用将其全部并入于此。

[0035] 表一

[0036]

针	信号名称	I/O	功能
1	DGND	GND	移动装置中的数字接地
2	DGND	GND	移动装置中的数字接地
3	TPA+	I/O	FireWire 信号
4	USB D+	I/O	USB 信号
5	TPA-	I/O	FireWire 信号
6	USB D-	I/O	USB 信号
7	TPB+	I/O	FireWire 信号
8	USB Vbus	I	USB 功率进入;用于检测 USB 主机
9	TPB-	I/O	FireWire 信号
10	附件识别	I	识别外部附件
11	F/W PWR+	I	Firewire 和充电器输入电源 (8 ~ 15V DC)
12	F/W PWR+	I	Firewire 和充电器输入电源 (8 ~ 15DC)
13	附件电源	0	3.3V 是标称输出。低功率模式中的正常电流是 5mA, 在高功率模式中电流限于 100mA。
14	保留		
15	DGND	GND	移动装置中的数字接地
16	DGND	GND	移动装置中的数字接地
17	保留		
18	RX	I	接收数据
19	TX	0	发送数据
20	附件检测	I	附件检测
21	S 视频 Y	0	S 视频的亮度成分
22	S 视频 C	0	S 视频的色度成分
23	复合视频	0	复合信号
24	遥感	I	检测遥控
25	LINE-IN L	I	输入到移动装置的用于左声道的线路电平
26	LINE-IN R	I	输入到移动装置的用于右声道的线路电平
27	LINE-OUT L	0	输出到移动装置的用于左声道的线路电平
28	LINE-OUT R	0	输出到移动装置的用于右声道的线路电平
29	音频返回		音频返回。这是信号并且绝不要在附件内接地。
30	DGND	GND	移动装置中的数字接地

31	框架			用于连接器外壳的框架接地
32	框架			用于连接器外壳的框架接地

[0037] 如上所述,连接器系统 100 提供了被一大批电子装置广泛使用的互连平台。连接器系统 100 使手持式媒体播放器与包含主计算机的其它电子装置,诸如系泊站、许多不同

类型的电缆连接器、电池充电器和电源适配器、Hi-Fi 音响系统和 RF 系统以及照相机连接器的附属装置以及许多其它类型的装置互连。随着消费电子装置行业的发展,改变工业设计考虑和对进一步小型化的需求要求修改连接器的结构和设计。因此,存在的挑战是在保持与现有装置的兼容性的同时满足发展的工业设计要求。在一个实施例中,本实用新型修改了插头连接器 100 的结构设计,以在不影响功能或与现有插座连接器的兼容性的情况下实现更紧凑且单体的结构。

[0038] 参照图 4,该图示出了根据本实用新型的一个实施例的连接器 400。连接器 400 与插头连接器 101 相比更加紧凑,然而在功能上与连接器系统 100 等同并且在结构上与连接器系统 100 兼容。许多的结构修改使连接器 400 可以更紧凑同时向后兼容。在这些修改中有将对准柱 118 去除。这导致两个有利的特征。首先,连接器的总宽度 W 从约 21.30mm 减小到约 19.2mm。第二,去除对准柱提供了从卷绕整个连接器壳体的单板构建连接器外壳 402 的选项。在一个实施例中,形成连接器外壳的单板由诸如金属的导电材料制成,这进一步提高了连接器的 EMI 抑制。

[0039] 其次,替代槽或狭缝(图 1 和图 2、图 3 中的 114),如图 4 所示在外壳 402 的各侧板处形成台阶 404。这导致具有比下板的约 19.2mm 的宽度 W 小的约 17.35mm 的宽度 W' 的上板(如图 4 所示)。板的尺寸和得到的台阶 404A 和 404B 的尺寸被设计为在连接器 400 被插入插座连接器 102 中时与插座连接器 102 的啮合突起 108 摩擦地相配。台阶 404 的角度和曲率半径被设计为有利于将外壳 402 制造成导电材料的单板。在示出的例子中,从各侧的台阶得到的三个边缘中的每一个具有与锐角相对的弯曲轮廓。

[0040] 图 5A 和图 5B 示出了根据本实用新型的该实施例的连接器 400 的正面和背面的等距视图。如图 5A 和图 5B 所示,外壳 402 由卷绕连接器从而形成接缝 406 的材料的单板制成。在该实施例中,连接器 400 包含位于连接器的外壳 402 的一个板上而在另一个板上没有的弹性凸片 408A 和 408B。应当理解,凸片 408 的设置可以变化,从每侧有二个或更多个到根本没有。这些修改的组合产生了更紧凑且单体同时又与先前存在的连接器系统 100 兼容的连接器结构。

[0041] 如上面解释的那样,插头连接器具有从电缆到系泊站的大量应用。根据本实用新型的另一实施例,当连接器 400 是系泊站的一部分时,实现了连接器组件的进一步小型化。图 6 提供了系泊系统 600 的部件的子集的立体图。诸如插头连接器 101(图 1)的连接器被安装在印刷电路板(PCB)602 的顶表面上,而诸如插座连接器 102(图 1)的插座连接器被固定到 PCB 602 的一面。在完全组装系泊系统 600 之前,将通常由塑料制成的保护环 604 插入在连接器 101 的基座周围。图 7A 示出了组合的连接器 101 和塑料装饰环 604 的等距视图,而图 7B 提供了其侧视图。如图 6 和图 7B 所示,连接器/环组件通常倾斜一角度,该角度在本例子中为偏离垂直轴约 15 度的角度。该角度导致系泊在系泊系统 600 中的装置倾斜以向用户提供更好的观察角度。在图 7B 中还指出了得到的组件的基座结构的总厚度,该总厚度在这种情况下为约 3.9mm。图 7B 还示出了从基座下面向外延伸并延伸到 PCB 上的针 606。

[0042] 根据本实用新型的一个实施例,不使用插入在连接器的基座周围的单独的塑料装饰环,而是将更小的装饰环塑造到连接器基座上以形成一集成单元。图 8A 和图 8B 示出了具有集成的装饰环 802 的连接器组件 800 的背面和正面的等距视图。图 8B 示出了装饰环

802 中的可通过其到达针 804 的开口。将针 804 电连接到 PCB 上的导电迹线的焊接工艺将连接器组件 800 暴露于高温下。装饰环 802 因此优选由诸如玻璃增强尼龙等的可耐受较高温度的材料制成。

[0043] 具有集成装饰环 802 的连接器组件 800 具有明显减小的厚度,并因此可更低地放置于系泊基座中。图 9A 针对一示例性实施例指明基座厚度的减小,其中基座厚度被减小到约 1.42mm。虽然图 8A 和图 8B 示出了使用更紧凑的连接器设计(图 4 和图 5 中的 400)作为连接器组件 800 的一部分,但先前存在的连接器也可受益于塑造的装饰环设计。应当注意,在一些应用中可能希望在被系泊的装置的底部和连接器周围的系泊表面之间具有间隙。例如,手持式电子装置可具有诸如麦克风和扬声器的集成音响系统,该集成音响系统具有位于装置的基座上的接近与系泊连接器接合的连接器的开口。这种装置的声学需求可能要求当装置被系泊时在装置的底部和系泊表面之间存在间隙。对于这些应用,可将连接器组件 800 的总高度调整为产生希望的间隙以改善装置的声学性能。

[0044] 在另一实施例中,连接器组件 800 使用尺寸更小的针(图 8B 中的 804)。图 9B 示出了示例性的针 900 的形状。针 900 的高度更短并且具有更少的倒钩,在本例子中具有一个倒钩 902。在诸如插头连接器 101(图 1)的现有连接器中使用的针一般被设计为具有多个倒钩并且更高。倒钩一般被添加到针结构上以在它们被容纳于连接器内时增加保持力。尺寸减小的总体连接器结构允许连接器组件 800 使用更短的并具有更少倒钩的针 900。在一个实施例中,连接器组件 800 被设计为以比图 7B 所示的角度小的角度位于系泊系统的 PCB 上。根据本实施例,连接器组件的角度被减小到偏离垂直轴约 10 度。减小的角度降低了当媒体播放器装置被插入系泊站时翻倒的可能性,因此允许更小的系泊站覆盖区(footprint)。在于 2005 年 8 月 24 日提交的发明名称为“Docking Station for Handheld Electronic Devices”的共同受让的专利申请 No. 11/212302(代理机构卷号 20750P-0018800US/P3773US1)以及于 2003 年 4 月 25 日提交的发明名称为“Media Player System”的专利申请 No. 11/423490(代理机构卷号 20750P-000900US/P3032US1)中更详细地说明了可使用连接器组件 800 及其各种结构元件的示例性系泊系统,通过引用将它们的全部都并入于此。

[0045] 在又一实施例中,本实用新型提供了可将 PCB 集成到连接器仓 (boot) 内的改进的电缆连接器组件。参照图 10A,该图示出了与电缆连接器组件 1000 连接的电缆 1002 的一端。电缆连接器组件 1000 包含通过仓部分 1006 而固定到电缆 1002 的连接器 1004。仓 1006 一般由诸如塑料的材料制成,并被设置为保护使连接器 1004 与电缆 1002 内的导线电互连的配线并为用户提供了手柄。代替将电缆 1002 内的导线直接焊接到连接器 1004 中的针,根据本实施例的本实用新型使用 PCB 作为电缆和连接器之间的中间连接机构。PCB 被容纳于电缆连接器组件 1000 的仓 1006 内。如图 10A 所示的连接器 1004 是图 1 和图 2、图 3 所示的类型(插头连接器 101)。应当理解,本实用新型的该实施例也与诸如关于图 4 和图 5 说明的那些连接器的修改的连接器等同地工作。

[0046] 图 10B 示出了根据本实用新型的示例性实施例的电缆连接器组件 1000 的内部结构。绝缘导线 1008 在电缆 1002 和连接器 1004 之间的接触点附近延伸到电缆 1002 外面。应当理解,虽然在本例子中仅示出了四根导线 1008,但是导线的数量可根据电缆连接器的应用而改变。例如,当电缆连接器的另一端与通用串行总线 (USB) 连接器连接时,电缆将承载四根导线。在示出的实施例中,除了四根导线 1008 以外,电缆 1002 还包含从电缆端部延

伸出去的被分开的编带 (braid) 1010。编带 1010 优选采取网状编带的形式并为接地和连接器的其它导电部件提供屏蔽。该组件还包含通过例如焊接机构固定到连接器 1004 上的 PCB 1012。PCB 1012 包含焊盘 1014, 导线 1008 处于焊盘 1014 处并与其电连接。PCB 1012 上的导电迹线 (未示出) 通过接点 1016 将焊盘 1014 连接到连接器 1004 中的适当的针。在图 10B 所示的例子中示出的 PCB 1012 具有带有角的 C (或括弧) 的形状, 或者如果连同电缆 1002 一起观察, 那么它具有字母 T 的帽子的形状。PCB 1012 也可以具有其它形状。

[0047] 当多条电缆导线与多个紧密隔开的连接器针连接时, 将电缆导线直接连接到连接器针上需要较高的精度。将 PCB 1012 集成在电缆连接器组件 1000 的仓 1006 中的优点是: 通过 PCB 1012 制成的中间连接缓解了这种需要。根据本实用新型的本实施例的电缆连接器组件的另一优点是: 包含了 PCB 1012, 这允许制造商将诸如静电放电 (ESD) 保护电路、电缆识别电路或 EMI 抑制构造的其它功能加到 PCB 上。

[0048] 在一个实施例中, PCB 1012 还包含允许与电缆连接的装置识别电缆的类型的电缆识别电路。根据本实施例, PCB 1012 包含连接在连接器 1004 的两个预定针之间的电阻元件 1018。在一个例子中, 电阻器 1018 连接在连接器 1004 的针 10 和 15 之间, 其中, 根据表一所示的针指定表, 针 10 是“附件识别”输入针, 而针 15 是数字接地针。当电缆连接器组件 1000 被插入诸如便携式媒体播放器或移动电话的电子装置中时, 该装置将能够通过检测有无电阻器 1018 来识别电缆的类型。如上所述, 根据应用的需要, 可将其它功能加到集成的 PCB 上。例如, 电缆 1002 本身可被卷绕在铁素体中, 这增加了 EMI 吸收并进一步提高了电缆的 RF 性能。在于 2007 年 1 月 3 日提交的发明名称为“Cable with Noise Suppression”的共同待决并且共同受让的专利申请 No. ____/____ (客户用编号 P5067US1) 中更详细地说明了连接器电缆组件的该方面, 通过引用将其全部内容并入于此。

[0049] 已说明了根据本实用新型的改进的连接器和连接器组件的各个实施例。虽然在以上的特定实施例的上下文中说明了这些实用新型, 但许多修改和变型也是可能的。因此, 以上说明是出于说明的目的, 而不是想要进行限制。例如, 提到诸如金属或玻璃增强尼龙等的各种类型的材料是出于说明的目的, 并且其它类似的替代方案也落在本实用新型的范围内。此外, 提到的上述各种结构的顶部或底部或者正面和背面是相对的, 并且可根据参考点而互换地使用。类似地, 在以上的说明全文中提供的尺寸和大小仅是出于说明的目的, 这里说明的实用新型构思可被应用于具有不同尺寸的结构。因此, 本实用新型的范围和宽度不应被上述特定实施例所限制, 而应由以下的权利要求和它们的等同物的全部延伸来确定。

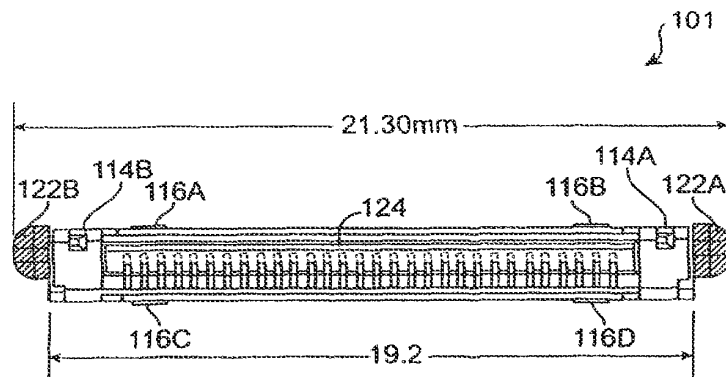


图 3

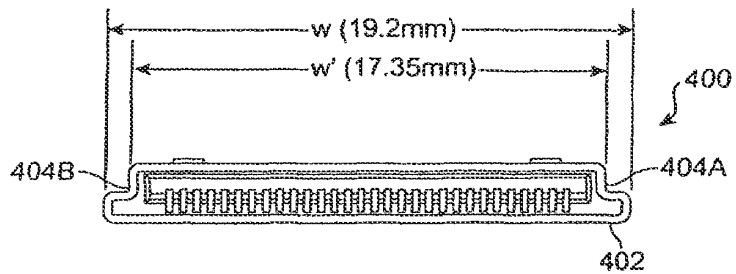


图 4

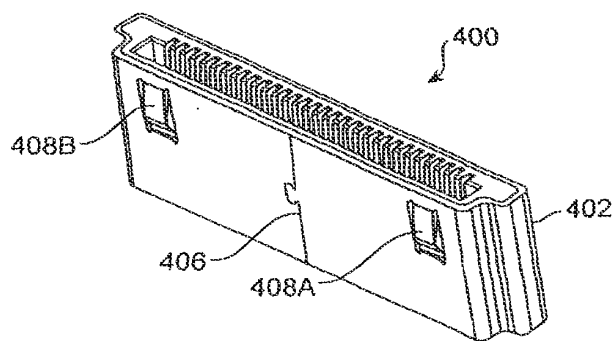


图 5A

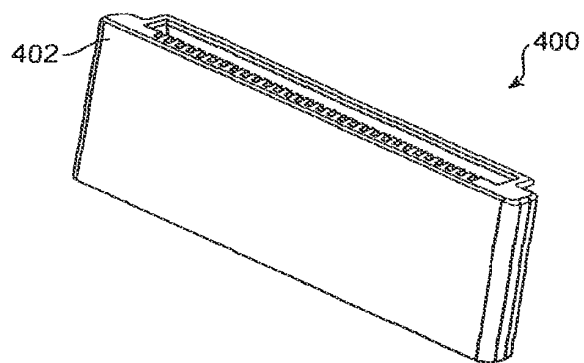


图 5B

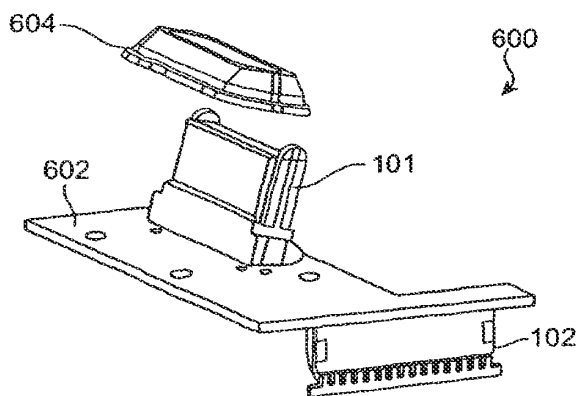


图 6

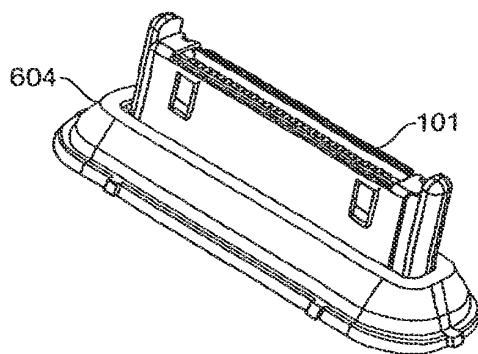


图 7A

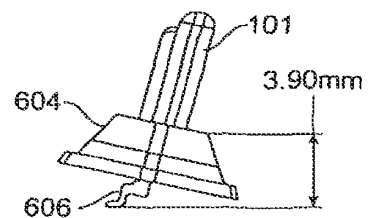


图 7B

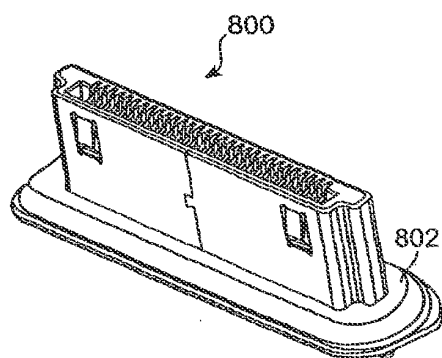


图 8A

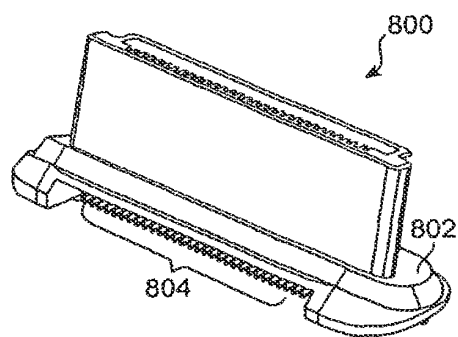


图 8B

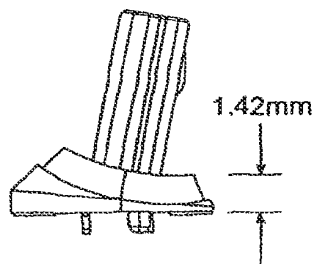


图 9A

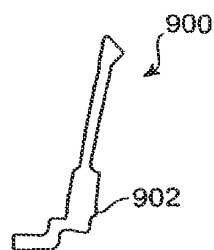


图 9B

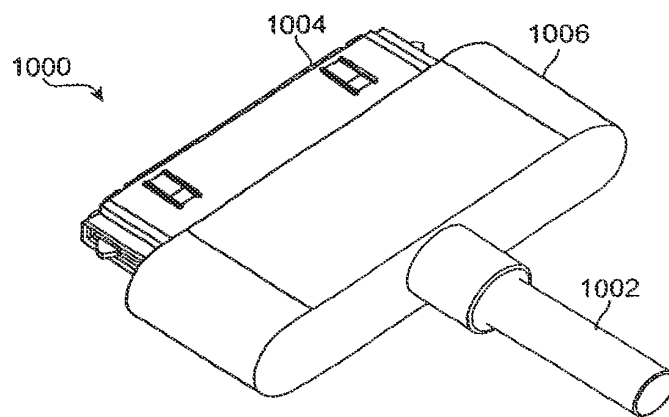


图 10A

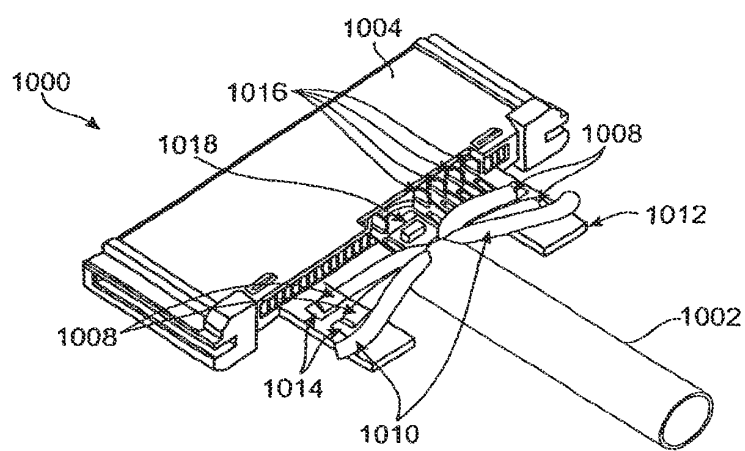


图 10B



Espacenet

Bibliographic data: CN102013587 (A) — 2011-04-13

Electric connector and terminal structure thereof

Inventor(s): ZHOUXIAN CAI ± (CAI ZHOUXIAN)**Applicant(s):** ZHOUXIAN CAI ± (CAI ZHOUXIAN)**Classification:** - **international:** *H01R13/02; H01R13/42; H01R13/516; H01R43/16*- **cooperative:****Application number:** CN201010105974 20100122**Priority number(s):** CN201010105974 20100122 ; CN200920177321U 20090908**Also published as:** CN201838763 (U)**Abstract of CN102013587 (A)**

The invention relates to an electric connector and a terminal structure thereof. The electric connector comprises a plastic base body and at least one row of terminals, wherein the plastic base body is internally provided with at least one row of terminal slots; the at least one row of terminals are arranged in the at least one row of terminal slots of the plastic base body; each terminal is provided with an extending part, a fixed part and a pin part from one end to the other end, wherein the fixed part is fixed with the terminal slot, the extending part is horizontally attached to the terminal slot and provided with a connection point, and the pin part extends out of the plastic base body; the at least one row of terminals is one of two rows of terminals formed by oppositely tearing and pressing a metal sheet; each terminal of the two rows of terminals is provided with an oppositely tearing and cutting part, and the oppositely tearing and cutting parts are mutually and seamlessly butted; when one terminal of the one row of terminals is oppositely and reversely connected between two adjacent terminals, the oppositely tearing and cutting part of the terminal is seamlessly connected with the oppositely tearing and cutting parts of the two adjacent terminals; and the oppositely tearing and cutting parts of the at least one row of terminals are the extending parts. In the invention, the extending parts of the two rows of terminals can be butted, arrayed and pressed on the pressing manufacture of the terminals, thereby decreasing the waste materials and reducing the material cost.



(12) 发明专利申请

(10) 申请公布号 CN 102013587 A

(43) 申请公布日 2011.04.13

(21) 申请号 201010105974.8

H01R 13/516(2006.01)

(22) 申请日 2010.01.22

H01R 43/16(2006.01)

(66) 本国优先权数据

200920177321.3 2009.09.08 CN

(71) 申请人 蔡周贤

地址 中国台湾台北县

(72) 发明人 蔡周贤

(74) 专利代理机构 永新专利商标代理有限公司

72002

代理人 李树明

(51) Int. Cl.

H01R 13/02(2006.01)

H01R 13/42(2006.01)

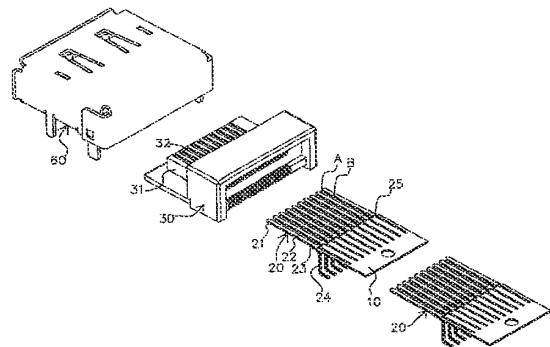
权利要求书 2 页 说明书 8 页 附图 14 页

(54) 发明名称

电连接器及其端子构造

(57) 摘要

一种电连接器及其端子构造,该电连接器包括有:塑胶座体,其内设有至少一排端子槽;至少一排端子,设于该塑胶座体的至少一排端子槽,每一端子由一端至另一端设有延伸部、固定部、及接脚部,该固定部与端子槽固定,该延伸部平贴于该端子槽且设有一接点,该接脚部伸出该塑胶座体外;该至少一排端子为一金属片对撕冲压所形成的二排端子的其中一排,该二排端子的每一端子具有一对撕冲切部位相互无缝对接,该一排端子其中一端子反向且反面接合于二相邻端子之间时,该一端子的对撕冲切部位与二相邻端子的对撕冲切部位无缝接合,该至少一排端子的对撕冲切部位为延伸部。在端子冲压制造上,二排端子的延伸部可对接排列冲压,减少废料,降低材料成本。



1. 一种电连接器，包括有：

一塑胶座体，其内设有至少一排端子槽；

至少一排端子，其设于该塑胶座体的至少一排端子槽，每一端子由一端至另一端设有一延伸部、一固定部、及一接脚部，该固定部与端子槽固定，该延伸部平贴于该端子槽且设有一接点，该接脚部伸出该塑胶座体外；

其特征在于：该至少一排端子为一金属片对撕冲压所形成的二排端子的其中一排，该二排端子的每一端子具有一对撕冲切部位相互无缝对接，该一排端子其中一端子反向且反面接合于二相邻端子之间时，该一端子的对撕冲切部位与二相邻端子的对撕冲切部位无缝接合，该至少一排端子的对撕冲切部位为延伸部。

2. 如权利要求 1 所述的电连接器，其特征在于：该至少一排端子的两相邻端子的延伸部的间距等于该延伸部的宽度。

3. 如权利要求 1 所述的电连接器，其特征在于：该延伸部刺破冲压出一弹片，该弹片设有该接点。

4. 如权利要求 1 所述的电连接器，其特征在于：该塑胶座体设有一舌片，且更设有一金属外壳包覆该塑胶座体，该金属外壳形成一连接槽，该至少一排端子槽延伸至该舌片一面。

5. 如权利要求 4 所述的电连接器，其特征在于：所述电连接器为一 eSATA 连接器，其中该至少一排端子为一排 7 个端子，该一排端子的延伸部长度不一。

6. 如权利要求 4 所述的电连接器，其特征在于：所述电连接器为一 displayport 连接器，其中该舌片的两侧设有向下的凸部，该至少一排端子为二排各 10 个端子，该二排端子的延伸部平贴于该舌片的两面且上下错开，该连接槽一侧的下端较上端为窄而形成一斜面。

7. 如权利要求 4 所述的电连接器，其特征在于：所述电连接器为一 HDMI 连接器，其中该舌片的两侧下端较上端为窄而形成二斜面，该至少一排端子为二排分别为 10 个端子及 9 个端子，该二排端子的延伸部平贴于该舌片的两面且上下错开，该连接槽二侧的下端较上端为窄而形成二斜面。

8. 如权利要求 4 所述的电连接器，其特征在于：所述电连接器为一 USB 连接器，其中该至少一排端子为一排 4 个端子。

9. 如权利要求 1 所述的电连接器，其特征在于：所述电连接器为一电子卡连接器，其设有一连接槽可插入连接一电子卡。

10. 如权利要求 9 所述的电连接器，其特征在于：所述电连接器为一智慧卡连接器，该电子卡为一智慧卡，该至少一排端子为二排端子，该二排端子前后对齐，该二排端子的延伸部宽度为 1.27mm。

11. 一排端子构造，包括有：

一料带；及

多个端子，其是呈间隔排列连接于该料带，每一端子由一端至另一端设有一延伸部、一固定部、及一接脚部，该延伸部的板面呈水平延伸且设有一接点；

其特征在于：该一排端子为一金属片对撕冲压所形成的二排端子的其中一排，该二排端子的每一端子具有一对撕冲切部位相互无缝对接，该一排端子其中一端子反向且反

面接合于二相邻端子之间时，该一端子的对撕冲切部位与二相邻端子的对撕冲切部位无缝接合，该至少一排端子的对撕冲切部位为延伸部。

12. 如权利要求 1 所述的一排端子构造，其特征在于：该至少一排端子的两相邻端子的延伸部的间距等于该延伸部的宽度。

13. 如权利要求 1 所述的一排端子构造，其特征在于：该延伸部刺破冲压出一弹片，该弹片设有该接点。

14. 如权利要求 1 所述的一排端子构造，其特征在于：该固定部后端中间连接该接脚部，该固定部后端两侧连接该料带且该处设有易于折断的切痕。

15. 二排端子构造，其为一金属片对撕冲压而形成，其包括有：

一第一排端子，其设有一料带及多个呈间隔排列连接于该料带的端子，每一端子由一端至另一端设有一延伸部、一固定部、及一接脚部，该延伸部的板面呈水平延伸且设有一接点，该每一端子的延伸部为对撕冲切部位；

一第二排端子，其设有一料带及多个呈间隔排列连接于该料带的端子，每一端子由一端至另一端设有一延伸部、一固定部、及一接脚部，该延伸部的板面呈水平延伸且设有一接点，该每一端子的延伸部为对撕冲切部位；

该第一、二排端子是呈反向对接，该第一排端子的各端子的对撕冲切部位无缝接合于该第二排端子的两相邻端子的对撕冲切部位的间隔区域。

电连接器及其端子构造

【技术领域】

[0001] 本发明是有关于一种电连接器，特别是关于一种端子在冲压制造上非常节省材料的电连接器。

【背景技术】

[0002] 电连接器的端子在制造上是以金属片冲压，冲压完成的端子是依电连接器的端子间距而间隔排列连接于一料带上，如此整排的端子可一次组装在电连接器的塑胶座体上。

[0003] 上述整排连续排列端子在冲压制造上，两相邻端子的间隔区域则是金属片打掉材料而形成，故此部份则成废料，因此，若要节省端子冲压上的成本则需减少废料形成。

【发明内容】

[0004] 本发明的主要目的在于提供一种电连接器，其在端子冲压制造上，二排端子的延伸部可无缝隙对接排列冲压，达到制造上节省材料，降低制造成本。

[0005] 为达上述目的，本发明电连接器包括有：一塑胶座体，其内设至少一排端子槽；至少一排端子，其设于该塑胶座体的至少一排端子槽，每一端子由一端至另一端设有一延伸部、一固定部、及一接脚部，该固定部与端子槽固定，该延伸部平贴于该端子槽且设有一接点，该接脚部伸出该塑胶座体外；其特征在于该至少一排端子是为一金属片对撕冲压所形成的二排端子的其中一排，该二排端子的每一端子具有一对撕冲切部位相互无缝对接，该一排端子其中一端子反向且反面接合于二相邻端子之间时，该一端子的对撕冲切部位与二相邻端子的对撕冲切部位无缝接合，该至少一排端子的对撕冲切部位为延伸部。

[0006] 承接上述，本发明提供一种电连接器，包括有：

[0007] 一塑胶座体，其内设至少一排端子槽；

[0008] 至少一排端子，其设于该塑胶座体的至少一排端子槽，每一端子由一端至另一端设有一延伸部、一固定部、及一接脚部，该固定部与端子槽固定，该延伸部平贴于该端子槽且设有一接点，该接脚部伸出该塑胶座体外；

[0009] 其特征在于：该至少一排端子为一金属片对撕冲压所形成的二排端子的其中一排，该二排端子的每一端子具有一对撕冲切部位相互无缝对接，该一排端子其中一端子反向且反面接合于二相邻端子之间时，该一端子的对撕冲切部位与二相邻端子的对撕冲切部位无缝接合，该至少一排端子的对撕冲切部位为延伸部。

[0010] 所述的电连接器，其特征在于：该至少一排端子的两相邻端子的延伸部的间距等于该延伸部的宽度。

[0011] 所述的电连接器，其特征在于：该延伸部刺破冲压出一弹片，该弹片设有该接点。

[0012] 所述的电连接器，其特征在于：该塑胶座体设有一舌片，且更设有一金属外壳包覆该塑胶座体，该金属外壳形成一连接槽，该至少一排端子槽延伸至该舌片一面。

[0013] 所述的电连接器，其特征在于：所述电连接器为一 eSATA 连接器，其中该至少一排端子为一排 7 个端子，该一排端子的延伸部长度不一。

[0014] 所述的电连接器，其特征在于：所述电连接器为一 display port 连接器，其中该舌片的两侧设有向下的凸部，该至少一排端子为二排各 10 个端子，该二排端子的延伸部平贴于该舌片的两面且上下错开，该连接槽一侧的下端较上端为窄而形成一斜面。

[0015] 所述的电连接器，其特征在于：所述电连接器为一 HDMI 连接器，其中该舌片的两侧下端较上端为窄而形成二斜面，该至少一排端子为二排分别为 10 个端子及 9 个端子，该二排端子的延伸部平贴于该舌片的两面且上下错开，该连接槽二侧的下端较上端为窄而形成二斜面。

[0016] 所述的电连接器，其特征在于：所述电连接器为一 USB 连接器，其中该至少一排端子为一排 4 个端子。

[0017] 所述的电连接器，其特征在于：所述电连接器为一电子卡连接器，其设有一连接槽可插入连接一电子卡。

[0018] 所述的电连接器，其特征在于：所述电连接器为一智慧卡连接器，该电子卡为一智慧卡，该至少一排端子为二排端子，该二排端子前后对齐，该二排端子的延伸部宽度为 1.27mm。

[0019] 本发明还提供一种一排端子构造，包括有：

[0020] 一料带；及

[0021] 多个端子，其是呈间隔排列连接于该料带，每一端子由一端至另一端设有一延伸部、一固定部、及一接脚部，该延伸部的板面呈水平延伸且设有一接点；

[0022] 其特征在于：该一排端子为一金属片对撕冲压所形成的二排端子的其中一排，该二排端子的每一端子具有一对撕冲切部位相互无缝对接，该一排端子其中一端子反向且反面接合于二相邻端子之间时，该一端子的对撕冲切部位与二相邻端子的对撕冲切部位无缝接合，该至少一排端子的对撕冲切部位为延伸部。

[0023] 所述的一排端子构造，其特征在于：该至少一排端子的两相邻端子的延伸部的间距等于该延伸部的宽度。

[0024] 所述的一排端子构造，其特征在于：该延伸部刺破冲压出一弹片，该弹片设有该接点。

[0025] 所述的一排端子构造，其特征在于：该固定部后端中间连接该接脚部，该固定部后端两侧连接该料带且该处设有易于折断的切痕。

[0026] 本发明还提供一种二排端子构造，其为一金属片对撕冲压而形成，其包括有：

[0027] 一第一排端子，其设有一料带及多个呈间隔排列连接于该料带的端子，每一端子由一端至另一端设有一延伸部、一固定部、及一接脚部，该延伸部的板面呈水平延伸且设有一接点，该每一端子的延伸部为对撕冲切部位；

[0028] 一第二排端子，其设有一料带及多个呈间隔排列连接于该料带的端子，每一端子由一端至另一端设有一延伸部、一固定部、及一接脚部，该延伸部的板面呈水平延伸且设有一接点，该每一端子的延伸部为对撕冲切部位；

[0029] 该第一、二排端子是呈反向对接，该第一排端子的各端子的对撕冲切部位无缝接合于该第二排端子的两相邻端子的对撕冲切部位的间隔区域。

[0030] 借由以上构造，在端子冲压制造上，二排端子的延伸部可对接排列冲压，达到减少废料，降低材料成本。

[0031] 本发明的上述及其他目的、优点和特色由以下较佳实施例的详细说明中并参考图式当可更加明白，其中：

【附图说明】

[0032] 图 1 是本发明第一实施例的立体分解图。

[0033] 图 2 是本发明第一实施例的立体组合图。

[0034] 图 3 是本发明第一实施例的侧视剖面图。

[0035] 图 4 是本发明第一实施例的端子冲压制造流程示意图。

[0036] 图 5 是本发明第一实施例的端子冲压制造示意图。

[0037] 图 6 是本发明第一实施例的二排端子的延伸部的切断面示意图。

[0038] 图 7 是本发明第一实施例的第一排端子的其中一端子成反面反向接合于两端子之间时其延伸部的切断面示意图。

[0039] 图 8 是本发明第一实施例的第一排端子的其中一端子成正面反向接合于两端子之间时其延伸部的切断面示意图。

[0040] 图 9 是本发明第二实施例的立体组合图。

[0041] 图 10 是本发明第三实施例的立体组合图。

[0042] 图 11 是本发明第三实施例的侧视剖面图。

[0043] 图 12 是本发明第三实施例的端子冲压制造流程示意图。

[0044] 图 13 是本发明第四实施例的端子冲压制造流程示意图。

[0045] 图 14 是本发明第五实施例的立体分解图。

[0046] 图 15 是本发明第五实施例的端子冲压制造流程示意图。

[0047] 图 16 是本发明第六实施例的立体分解图。

[0048] 图 17 是本发明第六实施例的端子立体图。

[0049] 图 18 是本发明第六实施例的侧视剖面图。

[0050] 图 19 是本发明第六实施例的端子冲压制造流程示意图。

[0051] 图 20 是本发明第七实施例的立体分解图。

[0052] 图 21 是本发明第七实施例的侧视剖面图。

[0053] 图 22 是本发明第七实施例的端子冲压制造立体图。

[0054] 图 23 是本发明第七实施例的端子冲压制造立体图。

[0055] 料带 10 端子 20 接点 21 延伸部 22

[0056] 固定部 23 接脚部 24 切痕 25 弹片 26

[0057] 倒刺 27 塑胶座体 30 舌片 31 端子槽 32 凸部 33

[0058] 连接槽 34 底座 36 上盖 37

[0059] 插入口 38 后盖 39

[0060] 第一端子 40 延伸部 41 固定部 42 接脚部 43

- [0061] 弹片 44 接点 45 开关端子 48、49
[0062] 第二端子 50 延伸部 51 固定部 52 接脚部 53
[0063] 弹片 54 接点 55
[0064] 金属外壳 60 斜边 62 金属上盖 65
[0065] 第一排端子 1 第二排端子 2 间距 A 宽度 B

【具体实施方式】

[0066] 请参阅图 1、图 2 及图 3，本实施例为一种 display port 连接器，其包括有：一塑胶座体 30、二排端子 20 及一金属外壳 60，其中：

[0067] 该塑胶座体 30 设有一舌片 31 及二排间隔排列的端子槽 32，该舌片 31 向前延伸凸出且其两侧设有向下的凸部 32，该两排端子槽 32 分别延伸至舌片 31 的两面且上下错开。

[0068] 该二排端子 20 设于该塑胶座体 30 的二排端子槽 32，每一排端子 20 共计有 10 个呈间隔排列连接于一料带 10，该一排端子 20 组装于一排端子槽 32 后再将该料带 10 折断分离，该端子 20 由前端至后端设有一延伸部 22、一固定部 23 及一接脚部 24；该固定部 23 后端中间连接该接脚部 24，该固定部 23 后端两侧连接该料带 10 且该处设有易于折断的切痕 25，该固定部 23 的宽度较该延伸部 22 的宽度和接脚部 24 的宽度为宽，该固定部 23 与端子槽 32 卡定；该延伸部 22 平贴于该端子槽 32 且前端设有一接点 21，该接脚部 24 伸出该塑胶座体 30 下端，该二排端子 20 的延伸部 22 平贴于该舌片 31 的两面且上下错开。

[0069] 该金属外壳 60 包覆该塑胶座体 30，该金属外壳 60 前段形成一连接槽 34，该连接槽 34 是下端较上端为窄且一侧形成一斜边 62，该舌片 31 位于该连接槽 34 中。

[0070] 该二排端子 20 皆为一金属片对撕冲压所形成二排端子的其中一排端子，该二排端子的每一端子具有一对撕冲切部位相互无缝对接，该一排端子 20 其中一端子 20 反向且反面接合于二相邻端子之间时，该一端子 20 的对撕冲切部位与二相邻端子 20 的对撕冲切部位无缝接合，该二排端子 20 的对撕冲切部位为延伸部 22，两相邻端子的延伸部 22 的间距 A 等于该延伸部 22 的宽度 B。

[0071] 借由以上构造，端子在冲压制造上如图 4 所示，二排间隔排列相连接的端子可由一片金属片对接排列冲压，由于两相邻端子 20 的延伸部 22 的间距 A 等于该延伸部 22 的宽度 B，故第一排端子 1 的各端子 20 的延伸部 22 无缝隙对接于第二排端子 2 的两相邻端子 20 的延伸部 22 之间，如此该金属片先对切成第一、二排端子 1、2，再拉开后弯折接脚部 24。

[0072] 上述端子在制造上，二排端子对接冲压时由于二排端子的延伸部是为无缝接合，而该延伸部 22 的长度占整体端子很大比率，故在制造上明显可节省材料，降低制造成本。

[0073] 请参阅图 5 及图 6，本发明以一片金属片作对撕冲压时，由于模具的上模 31 的宽度 s 必然较下模 32 的冲孔 33 的宽度 b 为小，由于第一排端子 1 的端子 20 的延伸部与第二排端子 2 的端子 20 的延伸部无缝对撕，故冲压后第一排端子 1 的端子 20 的延伸部的切断面的上段形成光滑面 36 而下段形成毛边 37，然而第二排端子 2 的端子 20 的延伸部的切

断面则是下段形成光滑面 36 而上段形成毛边 37，第一排端子 1 的端子 20 与第二排端子 2 的端子 20 接合时两者延伸部的切断面相互为毛边 37 接合光滑面 36，故可成密合连接。

[0074] 如此冲压后第一排端子 1 的端子 20 的延伸部上面宽度与第二排端子 2 的端子 20 的延伸部下面宽度均为 b ，而第一排端子 1 的端子 20 的延伸部下面宽度与第二排端子 2 的端子 20 的延伸部上面宽度均为 s ， b 较 s 稍大，意即第一排端子 1 的端子 20 成反面时延伸部的切断面即与第二排端子 2 的端子 20 的延伸部的切断面相同。

[0075] 请参阅图 7，第一排端子 1 其中一端子 20' 成反面反向接合于两端子之间时其延伸部的切断面与该两相邻端子 20 的延伸部的切断面是相互为毛边 37 接合光滑面 36，故可成密合连接。

[0076] 请参阅图 8，第一排端子 1 其中一端子 20' 成同面反向接合于两端子之间时其延伸部的切断面与该两相邻端子 20 的延伸部的切断面是相互为光滑面 36 接合光滑面 36，故无法密合连接。

[0077] 请参阅图 9，是为本发明第二实施例，其为一高清晰度多媒体介面 (High Definition Multimedia Interface, 简称 HDMI) 连接器，其大致与第一实施例相同，其差异在于本实施例的连接槽 34 是下端较上端为窄且两侧形成二斜边 62，且舌片 31 的两侧未设有向下的凸部，该二排端子 20 为二排分别为 10 个端子及 9 个端子，该二排端子 20 的延伸部 22 平贴于该舌片 31 的两面且上下错开。

[0078] 请参阅图 10、图 11 及图 12，是为本发明第三实施例，其是为一序列先进附加技术 (External Serial ATA, 简称 eSATA) 连接器，其包括有：一塑胶座体 30、一排端子 20、及一金属外壳 60，其中：

[0079] 该塑胶座体 30 设有一舌片 31 及一排间隔排列的端子槽 32，该舌片 31 向前延伸凸出，该一排端子槽 32 延伸至舌片 31 的上面。

[0080] 该一排端子 20 设于该塑胶座体 30 的二排端子槽 32，每一排端子 20 共计有 7 个呈间隔排列连接于一料带 10，该一排端子 20 组装于一排端子槽 32 后再将该料带 10 折断分离，该端子 20 由前端至后端设有一延伸部 22、一固定部 23 及一接脚部 24；该固定部 23 后端连接该料带 10 且该处设有易于折断的切痕，该固定部 23 的宽度较该延伸部 22 的宽度和接脚部 24 的宽度为宽，该固定部 23 与端子槽 32 的卡定；该延伸部 22 平贴于该端子槽 32 且前端设有一接点 21，该接脚部 24 伸出该塑胶座体 30 下端，该一排端子 20 的延伸部 22 长短不一，是形成三长四短。

[0081] 该金属外壳 60 包覆该塑胶座体 30，该金属外壳 60 前段与该塑胶座体 30 形成一连接槽 34，该舌片 31 位于该连接槽 34 中。

[0082] 该一排端子 20 为一金属片对撕冲压所形成二排端子的其中一排端子，该二排端子的每一端子具有一对撕冲切部位相互无缝对接，该一排端子 20 其中一端子 20 反向且反面接合于二相邻端子之间时，该一端子 20 的对撕冲切部位与二相邻端子 20 的对撕冲切部位无缝接合，该一排端子 20 的对撕冲切部位为延伸部 22，两相邻端子的延伸部 22 的间距 A 等于该延伸部 22 的宽度 B 。

[0083] 借由以上构造，端子在冲压制造上如图 12 所示，二排间隔排列相连接的端子可由一片金属片对接排列冲压，由于两相邻端子 20 的延伸部 22 的间距 A 等于该延伸部 22 的宽度 B ，故第一排端子 1 的各端子 20 的延伸部 22 无缝隙对接于第二排端子 2 的两相邻

端子 20 的延伸部 22 之间，如此该金属片先对切成第一、二排端子 1、2，再拉开后弯折接脚部 24。

[0084] 请参阅图 13，是为本发明第四实施例，其大致与第三实施例相同，其差异在于本实施例的延伸部 22 并非整体为对撕冲切部位，即局部为对撕冲切部位，局部为非对撕冲切部位，故第一排端子 1 的各端子 20 的延伸部 22 对接于第二排端子 2 的两相邻端子 20 的延伸部 22 之间时，局部为无缝接合，局部形成间隙 29。

[0085] 请参阅图 14 及图 15，是为本发明第五实施例，其为一种通用串行总线 (Universal Serial Bus, 简称 USB) 连接器，其包括有：一塑胶座体 30、一排端子 20 及一金属外壳 60，其中：

[0086] 该塑胶座体 30 设有一舌片 31 及一排间隔排列的端子槽 32，该舌片 31 向前延伸凸出，该一排端子槽 32 分别延伸至舌片 31 的上面，另设有一后盖 39 由下而上盖合于该塑胶座体 30 后端。

[0087] 该一排端子 20 设于该塑胶座体 30 的一排端子槽 32，每一排端子 20 共计有 4 个呈间隔排列连接于一料带 10，该一排端子 20 组装于一排端子槽 32 后再将该料带 10 折断分离，该端子 20 由前端至后端设有一延伸部 22、一固定部 23 及一接脚部 24；该固定部 23 后端连接该料带 10 且该处设有易于折断的切痕 25，该固定部 23 设有倒刺 27 与端子槽 32 卡定；该延伸部 22 平贴于该端子槽 32 且接近前端板面刺破冲压出一弹片 26，该弹片 26 一端连接于该延伸部 22 而另一端向后延伸并呈开放，该弹片设有一凸出的接点 21，该接脚部 24 伸出该塑胶座体 30 下端。

[0088] 该金属外壳 60 包覆该塑胶座体 30，该金属外壳 60 前段形成一连接槽 34，该舌片 31 位于该连接槽 34 中。

[0089] 该一排端子 20 为一金属片对撕冲压所形成二排端子的其中一排端子，该二排端子的每一端子具有一对撕冲切部位相互无缝对接，该一排端子 20 其中一端子 20 反向且反面接合于二相邻端子之间时，该一端子 20 的对撕冲切部位与二相邻端子 20 的对撕冲切部位无缝接合，该一排端子 20 的对撕冲切部位为延伸部 22 及固定部 23，延伸部 22 及固定部 23 等宽，两相邻端子的延伸部 22 及固定部 23 的间距 A 等于该延伸部 22 及固定部 23 的宽度 B。

[0090] 借由以上构造，端子在冲压制造上如图 15 所示，二排间隔排列相连接的端子可由一片金属片对接排列冲压，由于两相邻端子 20 的延伸部 22 及固定部 23 的间距 A 等于该延伸部 22 及固定部 23 的宽度 B，故第一排端子 1 的各端子 20 的延伸部 22 及固定部 23 无缝隙对接于第二排端子 2 的两相邻端子 20 的延伸部 22 及固定部 23 之间，如此该金属片先对切成第一、二排端子 1、2，再拉开后弯折接脚部 24。

[0091] 本实施例由于对撕冲切部位为延伸部 22 及固定部 23，故在端子制造上对撕冲切的长度甚长，非常节省端子用料。

[0092] 请参阅图 16、图 17、图 18 及图 19，是为本发明第六实施例，其为一种记忆卡连接器，其包括有：一塑胶座体 30、一排端子 20 及一金属上盖 65，其中：

[0093] 该塑胶座体 30 设有一排间隔排列的端子槽 32 及一连接槽 34，该连接槽 34 可容纳一记忆卡。

[0094] 该一排端子 20 设于该塑胶座体 30 的一排端子槽 32，每一排端子 20 共计有 9 个

呈间隔排列连接于一料带 10，该一排端子 20 组装于一排端子槽 32 后再将该料带 10 折断分离，该端子 20 由前端至后端设有一延伸部 22、一固定部 23 及一接脚部 24；该固定部 23 后端连接该料带 10 且该处设有易于折断的切痕，该固定部 23 设有倒刺 27 与端子槽 32 的卡定；该延伸部 22 平贴于该端子槽 32 且前端与端子槽 32 卡定，该延伸部 22 接近前端板面刺破冲压出一弹片 26，该弹片 26 一端连接于该延伸部 22 而另一端向后延伸并呈开放，该弹片 26 设有一凸出的接点 21，该接脚部 24 伸出该塑胶座体 30 下端。

[0095] 该金属上盖 65 设有一顶面及两侧面，其盖合该塑胶座体 30 上。

[0096] 该一排端子 20 为一金属片对撕冲压所形成二排端子的其中一排端子，该二排端子的每一端子具有一对撕冲切部位相互无缝对接，该一排端子 20 其中一端子 20 反向且反面接合于二相邻端子之间时，该一端子 20 的对撕冲切部位与二相邻端子 20 的对撕冲切部位无缝接合，该一排端子 20 的对撕冲切部位为延伸部 22 及固定部 23，延伸部 22 及固定部 23 等宽，两相邻端子的延伸部 22 及固定部 23 的间距 A 等于该延伸部 22 及固定部 23 的宽度 B。

[0097] 借由以上构造，端子在冲压制造上如图 19 所示，二排间隔排列相连接的端子可由一片金属片对接排列冲压，由于两相邻端子 20 的延伸部 22 及固定部 23 的间距 A 等于该延伸部 22 及固定部 23 的宽度 B，故第一排端子 1 的各端子 20 的延伸部 22 及固定部 23 无缝隙对接于第二排端子 2 的两相邻端子 20 的延伸部 22 及固定部 23 之间，如此该金属片先对切成第一、二排端子 1、2，该第一排端子 1 的各端子的延伸部 22 前端先连接于该第二排端子 2 的料带 10，该第二排端子 2 的各端子的延伸部 22 前端先连接于该第一排端子 1 的料带 10，如此该第一排端子 1 及第二排端子 2 可先一同电镀后再切断拉开，如此在电镀上更为简化且二排端子相联结可更为平稳。

[0098] 请参阅图 20 及图 21，是为本发明第七实施例，其为一种智慧卡连接器，其包括有：一塑胶座体 30、一排第一端子 40 及一排第二端子 50，其中：

[0099] 该塑胶座体 30 设有一底座 36 及一盖合于该底座 36 上的上盖 37，其内设有一容置一智慧卡的连接槽 34，该塑胶座体前端设有该连接槽的插入口 38，该底座 36 上接近后端设有一对开关端子 48、49，该智慧卡插入该连接槽 34 时可触动该一对开关端子 48、49，该底座 36 中段设有一排间隔排列且前后贯通的端子槽 32。

[0100] 该一排第一端子 40 设于该一排端子槽 32 的后段，每一第一端子 40 由前而后设有一延伸部 41、一固定部 42 及一接脚部 43，该延伸部 41 呈水平延伸且平贴于端子槽 32 的底面，其前段的板面向上刺破冲压凸出一弹片 44，该弹片 44 设有一凸出的接点 45，其一端连接于延伸部的前端，另一端向接脚部 43 方向延伸凸出并成开放，该弹片 44 凸出端子槽 32 至该连接槽 34，该固定部 42 固定于端子槽 32，该接脚部 43 延伸至塑胶座体 30 后端伸出塑胶座体 30 外。

[0101] 该一排第二端子 50 设于该一排端子槽 32 的前段且与该一排第一端子 40 成前后对齐，每一第二端子 50 由一端至另一端设有一延伸部 51、一固定部 52 及一接脚部 53，该延伸部 51 呈水平延伸且较第一端子 40 的延伸部 41 为短，其平贴于端子槽 32 的底面，其前段的板面向下刺破冲压凸出一弹片 54，该弹片 54 成一弹片，其一端连接于延伸部，另一端向远离接脚部 53 方向延伸凸出并成开放，该弹片 54 凸出端子槽 32 至该连接槽 34，该固定部 52 固定于端子槽 32，该接脚部 53 延伸至塑胶座体 30 前端伸出塑胶座体 30

外。

[0102] 请参阅图 22，该一排第一端子 40 及一排第二端子 50 是由一片铜材对撕冲压而成，每一端子设有一对撕冲切部位，该一排第一端子 40 及一排第二端子 50 是呈反向对接，该一排第一端子 40 的各端子的对撕冲切部位无缝接合于该第二端子 50 的两相邻端子的对撕冲切部位之间，第一、二端子 40、50 的对撕冲切部位为延伸部，该一排第一端子 40 的延伸部宽度 41 与二相邻端子的延伸部 41 间距相同，该一排第二端子 50 的延伸部 51 宽度与二相邻端子的延伸部 51 间距相同，该一排第二端子的每一端子 50 的延伸部 51 反向无缝接合于第一端子 40 的二相邻端子的延伸部 41 之间，该一排第一端子的各第一端子 40 的延伸部 41 前端连接于该一排第二端子 50 的料带 10，该一排第二端子的各第二端子 50 的延伸部 51 前端连接于该一排第一端子 40 的料带 10，如此该一排第一端子 40 及该一排第二端子 50 可先一同电镀后再切断拉开，如此在电镀上更为简化且二排端子相联结可更为平稳。

[0103] 由于智慧卡连接器的端子间距为 2.54mm，故该一排第一端子及一排第二端子的延伸部宽度为 1.27mm。

[0104] 请参阅图 23，是为一片铜材对撕冲压成相同形状的二排第二端子 50，其同样是二排第二端子 50 的延伸部 51 相互反向无缝接合。另外，同样亦可一片铜材对撕冲压成相同形状的二排第一端子 40。

[0105] 在较佳实施例的详细说明中所提出的具体的实施例仅为了易于说明本发明的技术内容，而并非将本发明狭义地限制于该实施例，在不超出本发明的精神及申请专利范围的情况，可作种种变化实施。

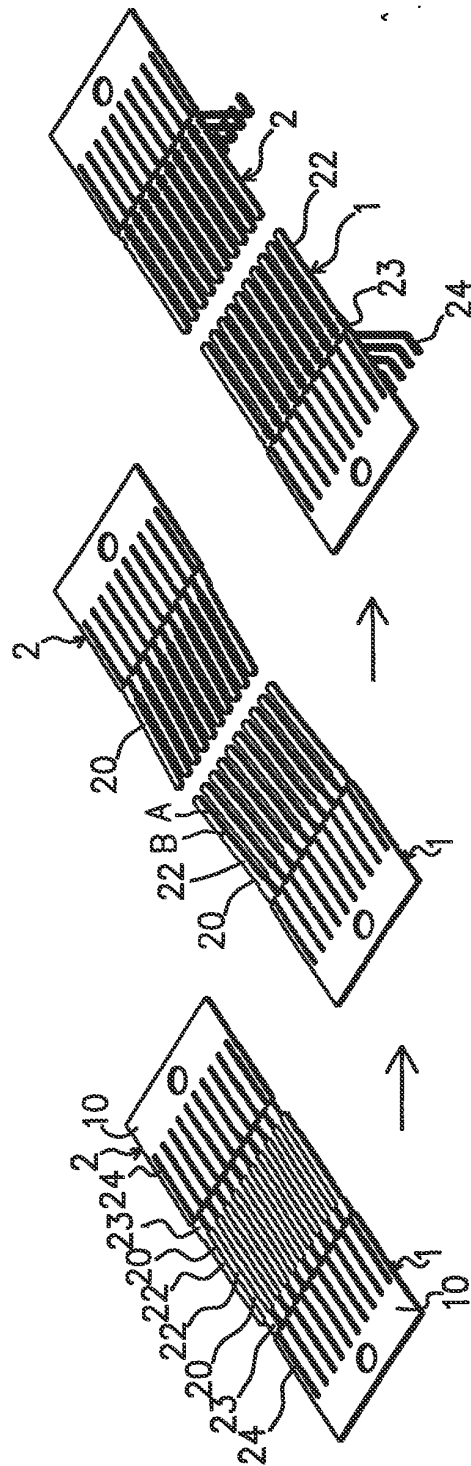


图 4

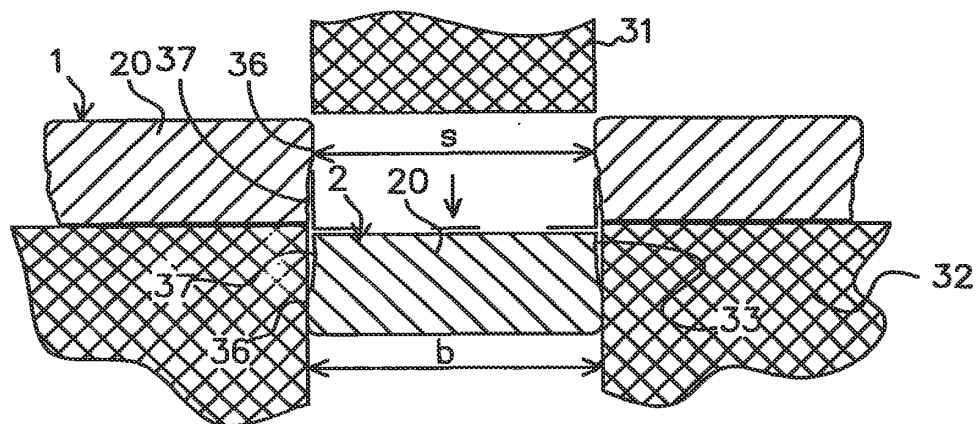


图 5

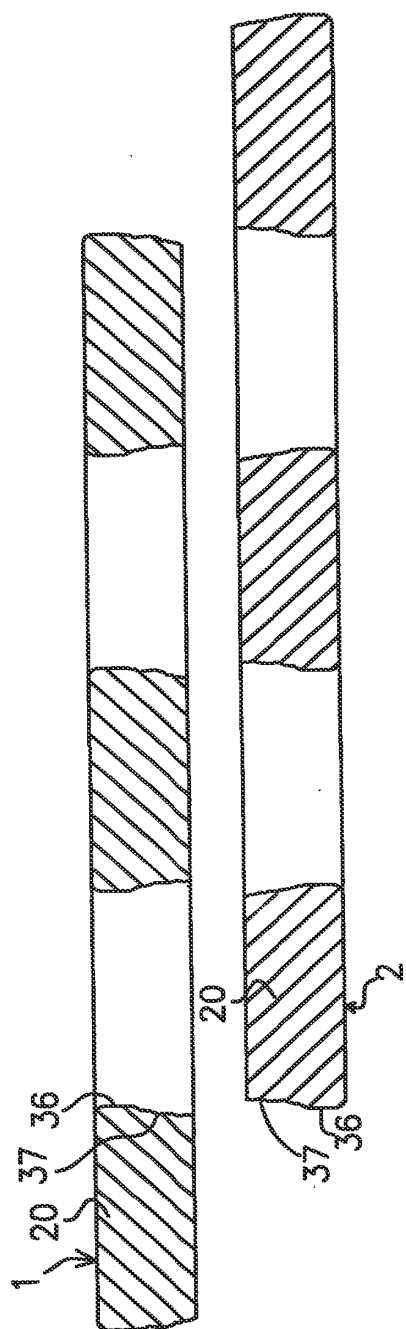


图 6

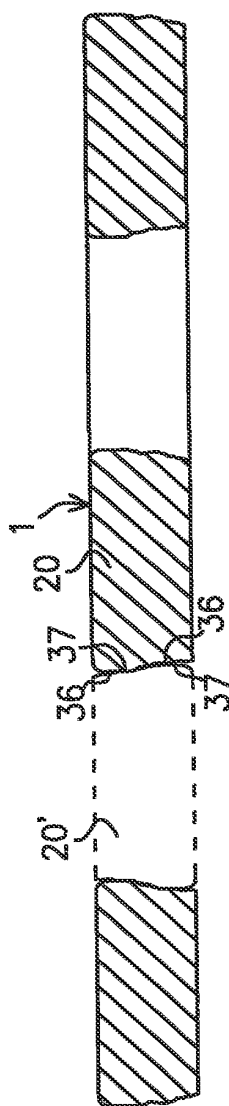


图 7

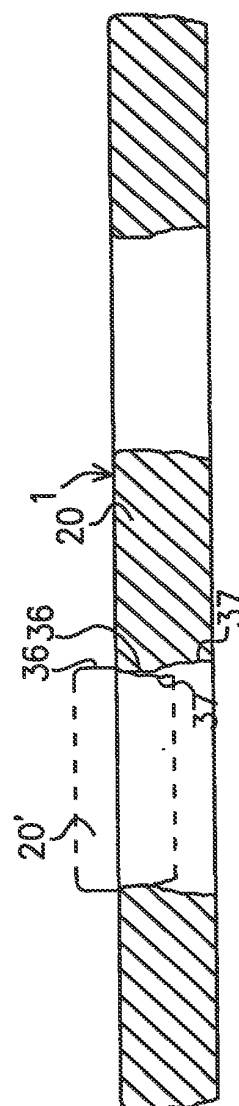


图 8

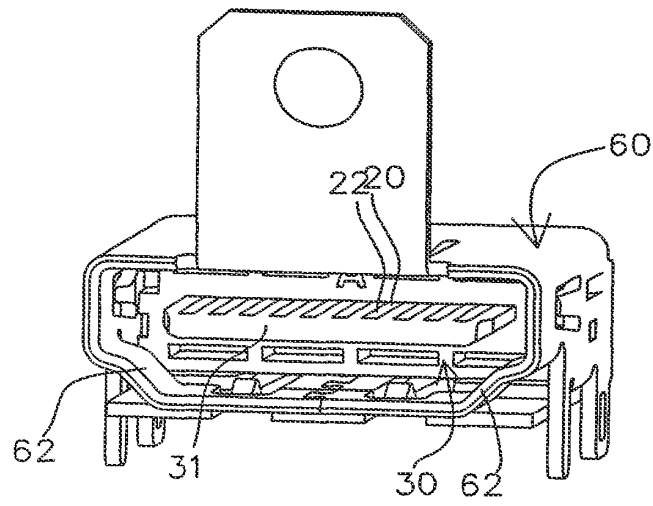


图 9

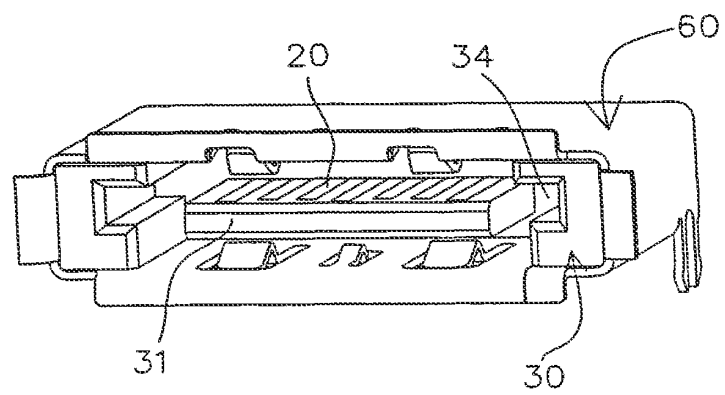


图 10

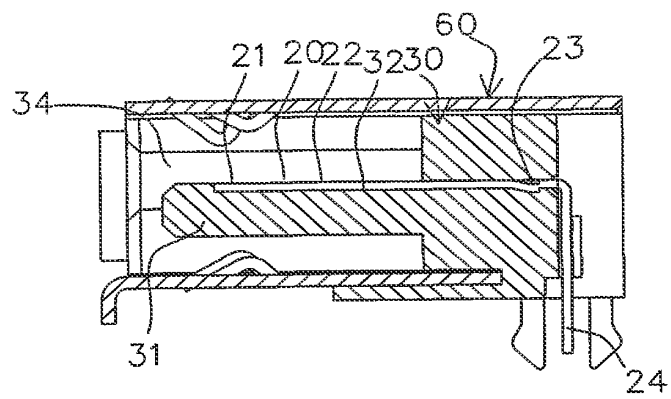


图 11

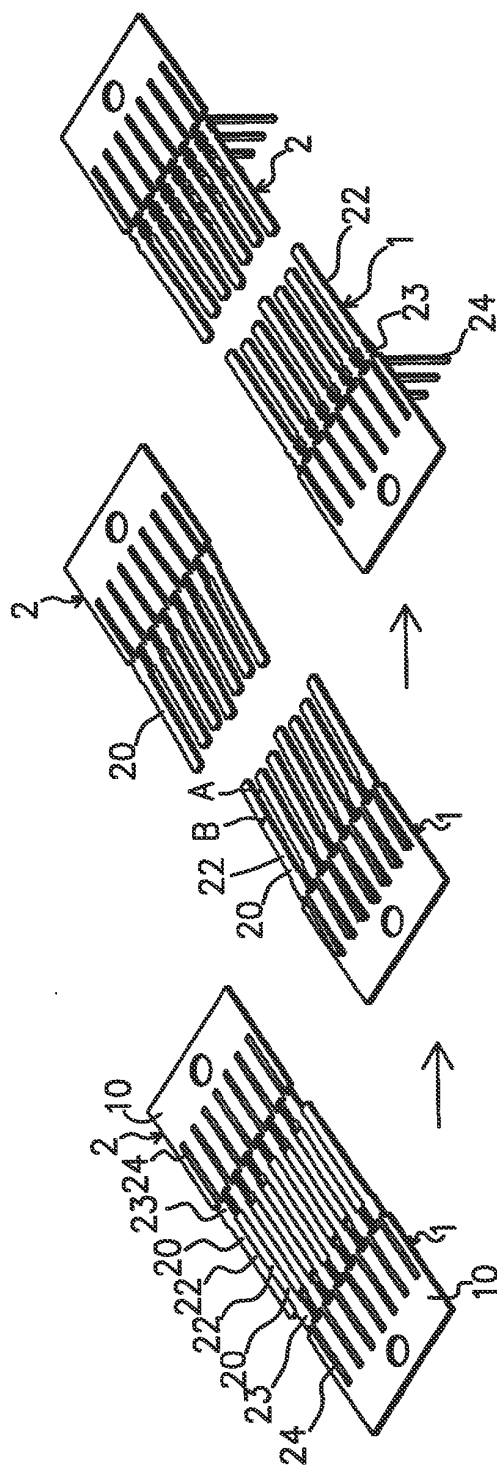


图 12

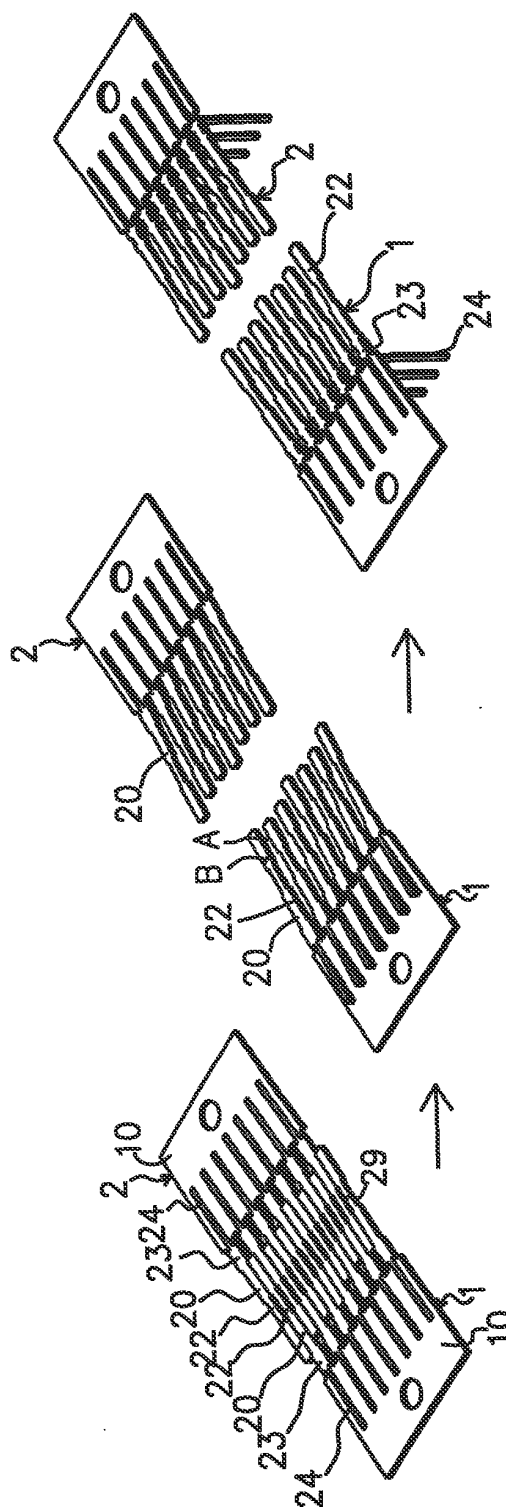


图 13

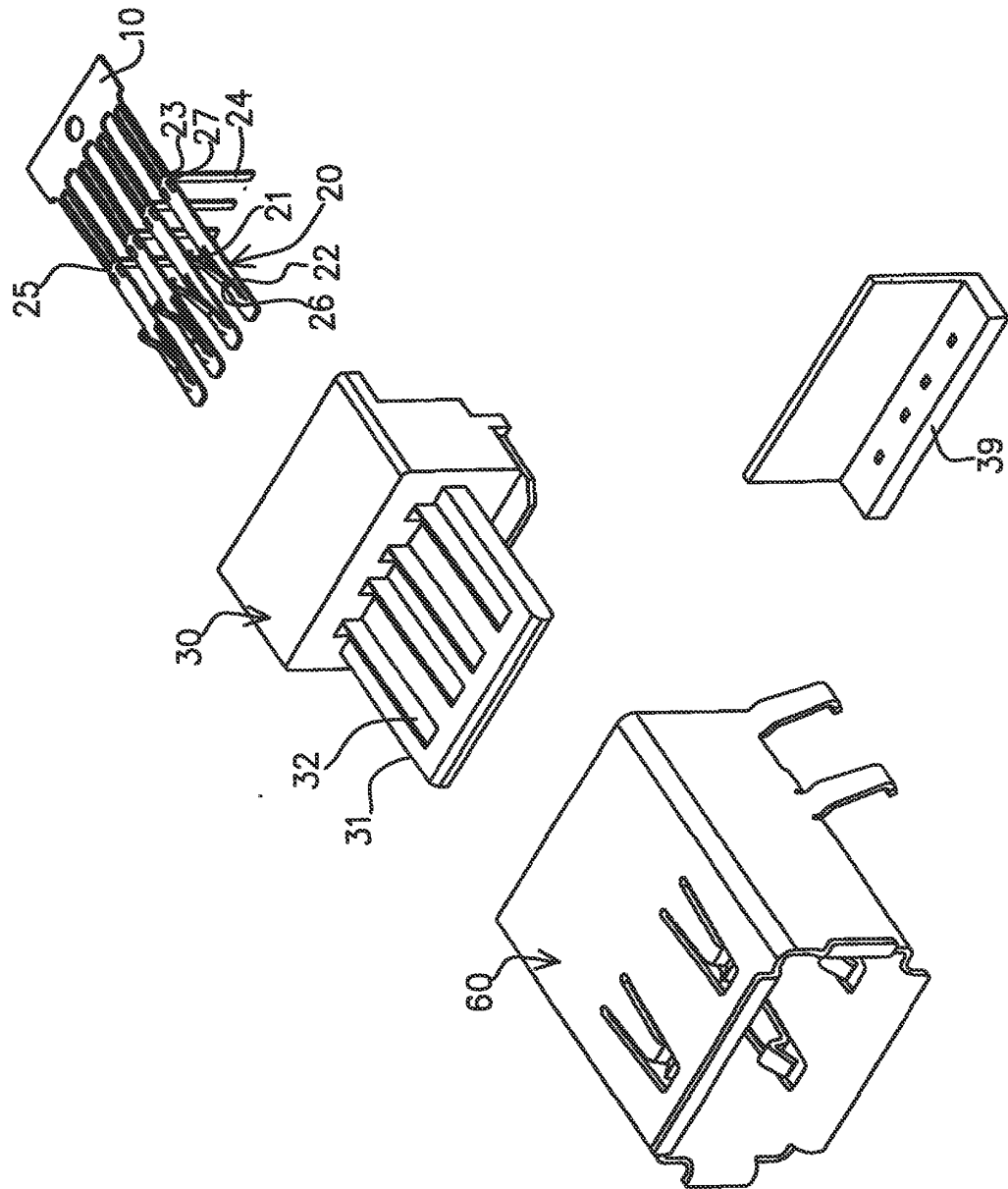


图 14

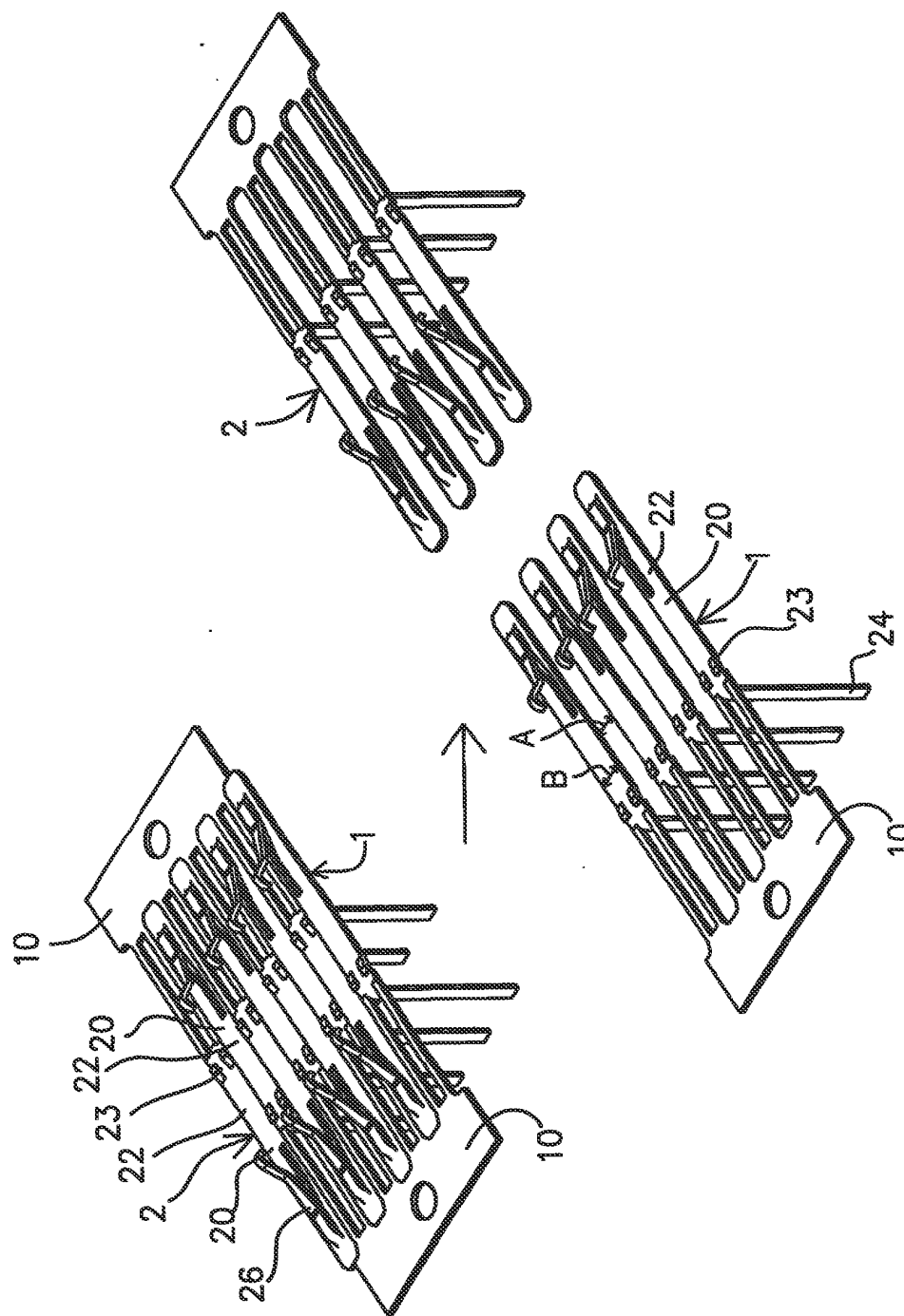


图 15

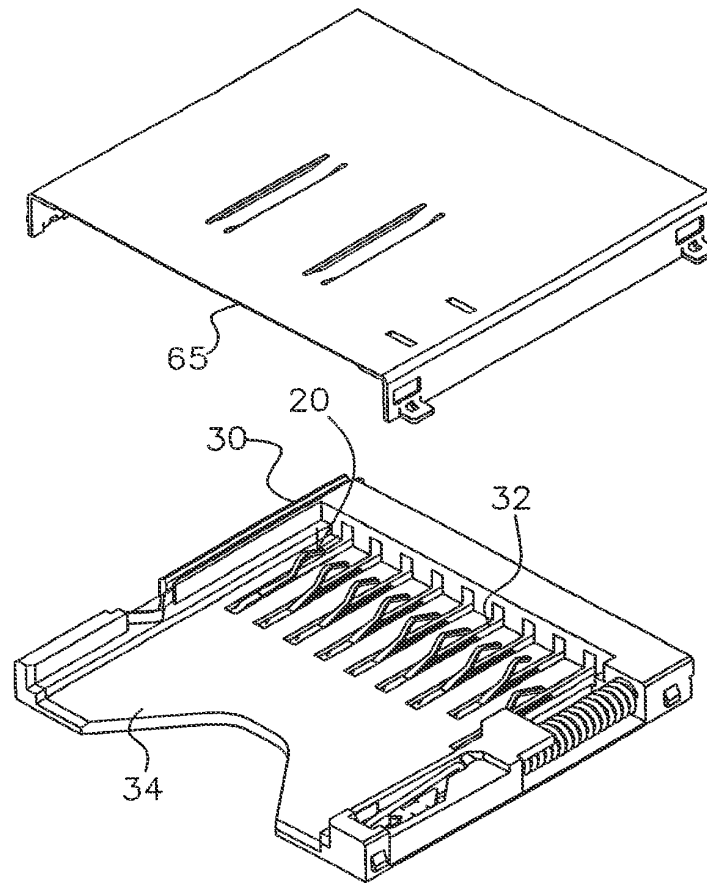


图 16

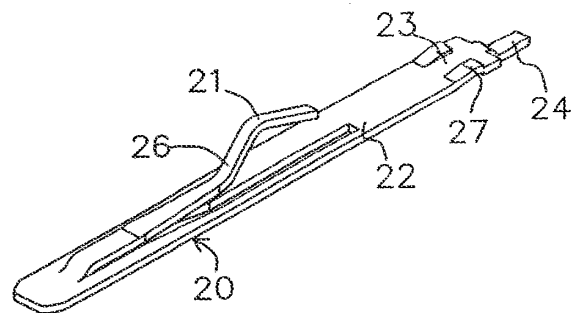


图 17

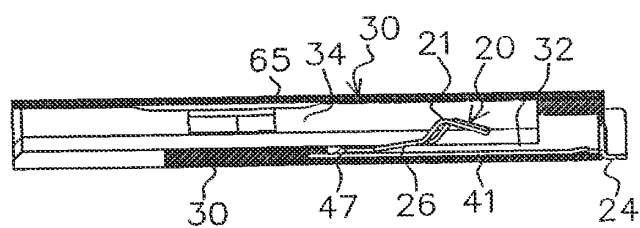


图 18

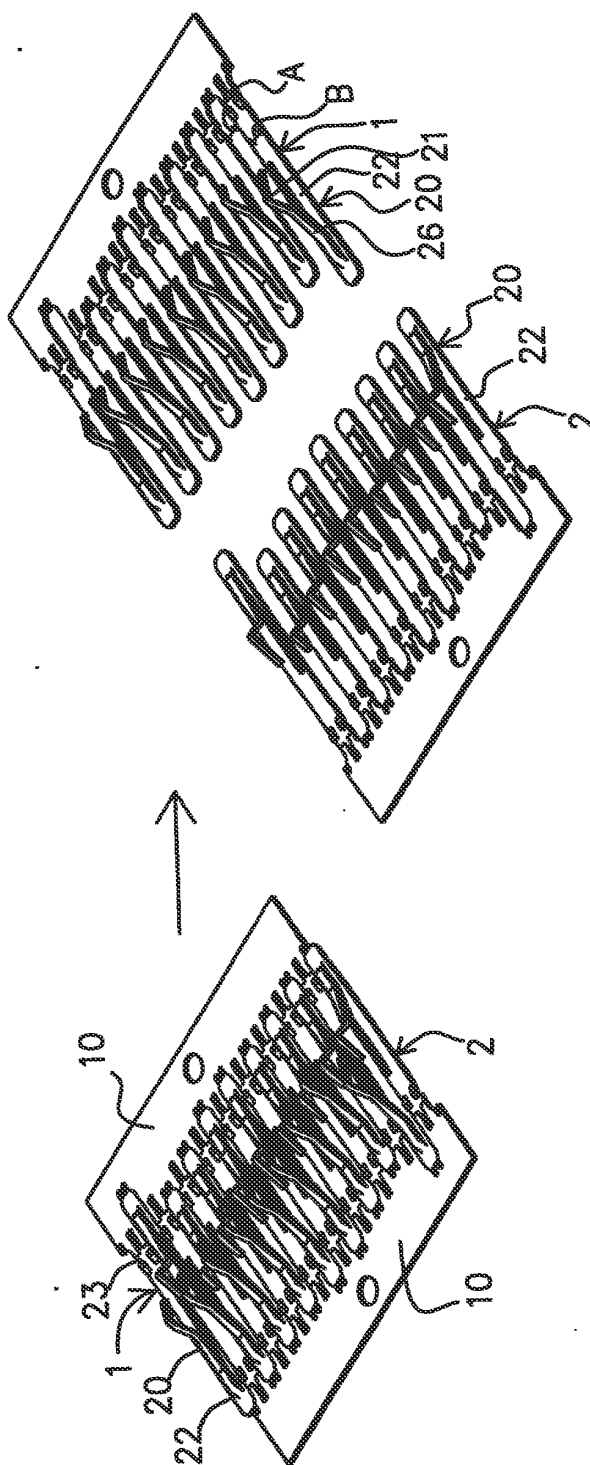


图 19

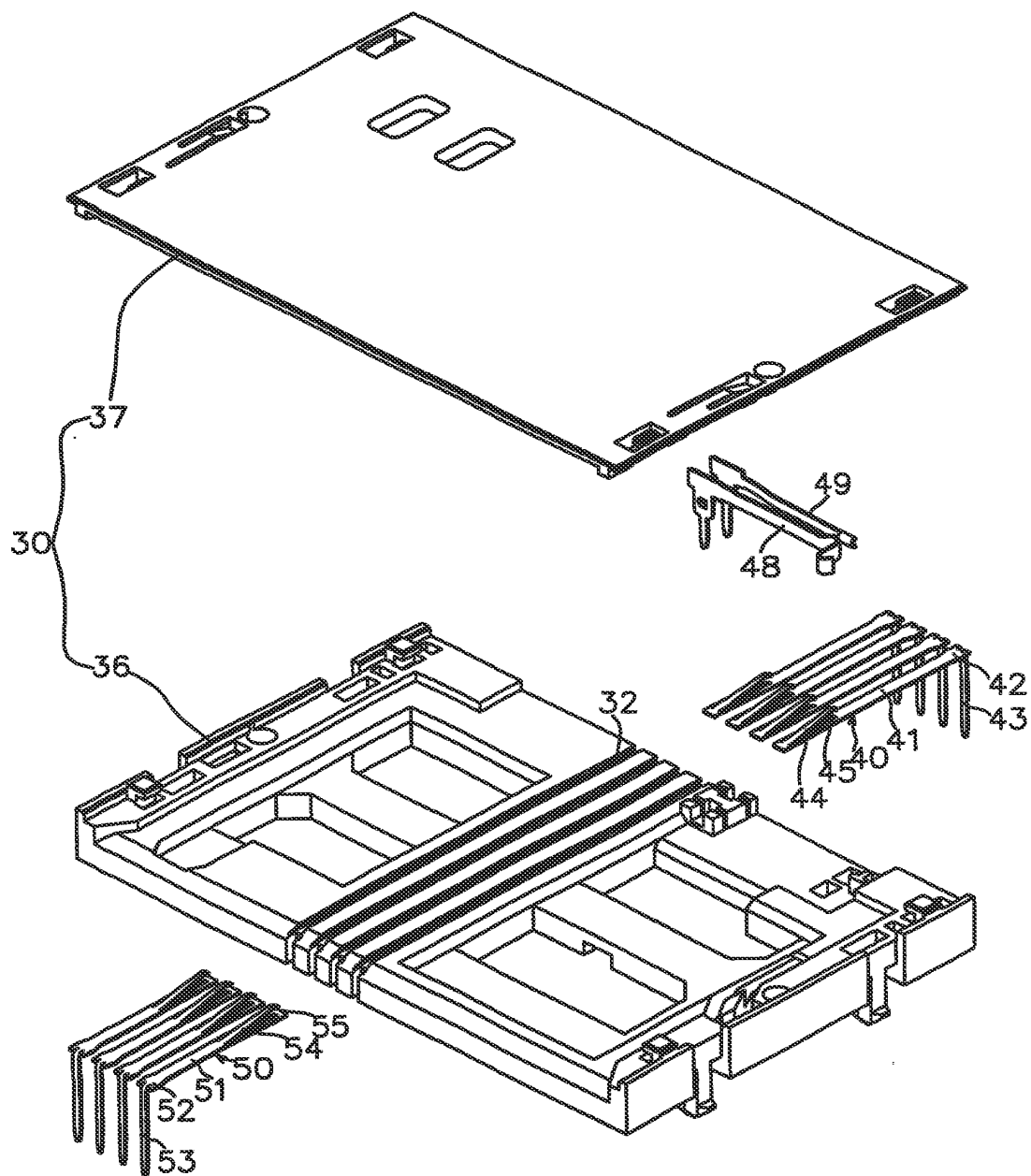


图 20

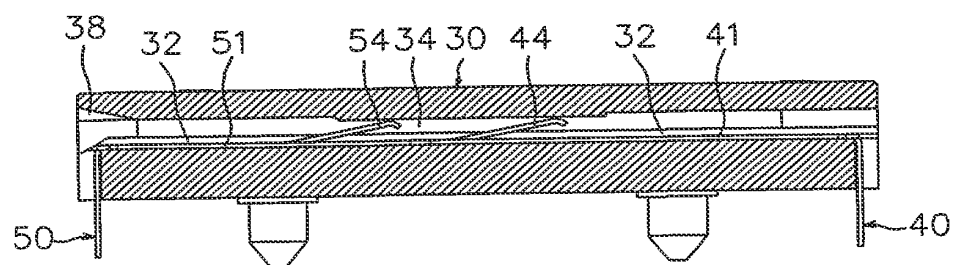


图 21

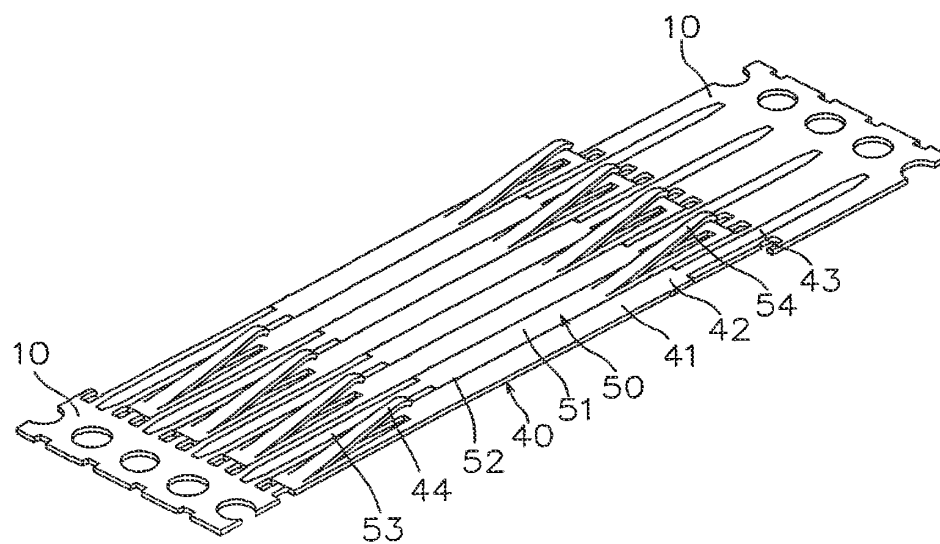


图 22

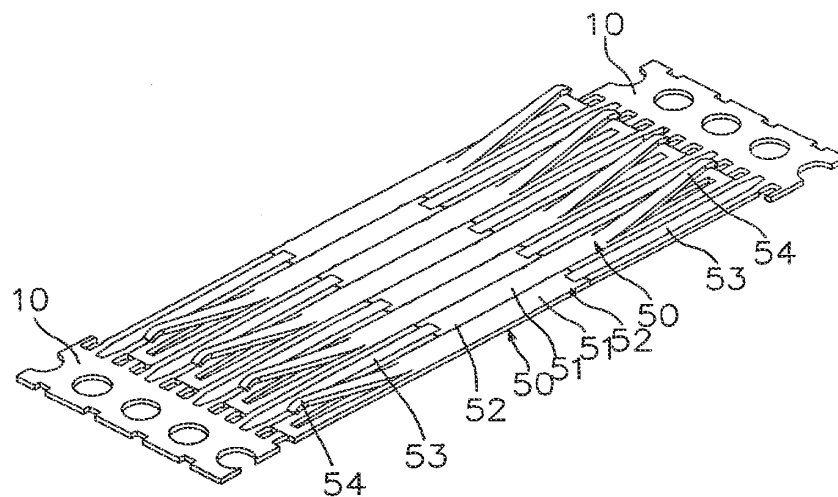
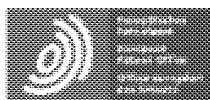


图 23



Espacenet

Bibliographic data: CN2682675 (Y) — 2005-03-02**Electric connector**

Inventor(s): CHEN WEIXING [CN]; ZHUANG QUAN [CN]; WANG NING [CN] ±
(WEIXING CHEN, ; QUAN ZHUANG, ; NING WANG)

Applicant(s): FOXCONN KUNSHAN COMP INTERFACE [CN] ± (FOXCONN
(KUNSHAN) COMPUTER INTERFACES CO., LTD)

Classification: - **international:** H01R12/16; (IPC1-7): H01R13/648
- **cooperative:** H01R12/7088 (EP, US); H01R12/716 (EP, US);
H01R13/658 (EP, US)

Application number: CN200320120260U 20031203

Priority number(s): CN200320120260U 20031203

Also published as: US2005124218 (A1) US7037135 (B2)

Abstract of CN2682675 (Y)

The utility model discloses an electric connector, comprising an insulating body, a plurality of conductive terminals which are held in the insulating body, an inner shield casing which is covered outside the insulating body, and an outer shield casing which is covered outside the inner shield casing. A plurality of elastic pieces are arranged on the surrounding side walls of the inner shield casing, and the elastic pieces are matched with a butt connector to provide a retentivity for matching connections. The outer shield casing which is next to the inner shield casing is closely bunted to the inner shield casing. The structure of double shield casings can guarantee the butt retentivity between the electric connector and a butt connector, and can guarantee the strength of the outer casing of the electric connector; the effects are not easily lost after repeated plugging and pulling.

[19] 中华人民共和国国家知识产权局

[51] Int. Cl.⁷
H01R 13/648



[12] 实用新型专利说明书

[21] ZL 专利号 200320120260. X

[45] 授权公告日 2005 年 3 月 2 日

[11] 授权公告号 CN 2682675Y

[22] 申请日 2003.12.3

[21] 申请号 200320120260. X

[73] 专利权人 富士康(昆山)电脑接插件有限公司
地址 215316 江苏省昆山市玉山镇北门路 999 号

共同专利权人 鸿海精密工业股份有限公司

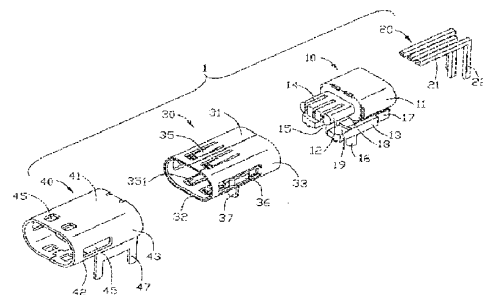
[72] 设计人 陈卫兴 庄 权 王 宁 陈志强
薛亚磊

权利要求书 2 页 说明书 3 页 附图 4 页

[54] 实用新型名称 电连接器

[57] 摘要

本实用新型公开一种电连接器，其包括有绝缘本体、收容于绝缘本体内的若干导电端子、包覆于绝缘本体外的内遮蔽壳体及包覆于内遮蔽壳体外的外遮蔽壳体。该内遮蔽壳体四周侧壁上设有若干弹片，其与对接连接器相配合以提供配接时的保持力。外遮蔽壳体紧挨着内遮蔽壳体，且与内遮蔽壳体紧密抵靠。双遮蔽壳体的结构保证了该种电连接器与对接连接器间的对接保持力和电连接器外部壳体的强度，反复插拔不易失效。



知识产权出版社出版

1. 一种电连接器，其包括有绝缘本体及收容于绝缘本体内的若干导电端子，其特征在于：所述电连接器还包括相互紧挨着的内遮蔽壳体与外遮蔽壳体，内遮蔽壳体包围形成一收容空间，内遮蔽壳体设有凸伸入上述收容空间的若干弹片，所述外遮蔽壳体包覆于上述内遮蔽壳体外，与内遮蔽壳体紧密抵靠。

2. 如权利要求 1 所述的电连接器，其特征在于：所述外遮蔽壳体上设有供内遮蔽壳体的若干弹片受来自于收容空间内的抵压而偏转变形时伸入其内的若干开口。

3. 如权利要求 2 所述的电连接器，其特征在于：所述绝缘本体包括基部及自基部延伸而出的舌板，舌板与内遮蔽壳体间形成收容空间，舌板内设有若干端子槽道以收容导电端子。

4. 如权利要求 3 所述的电连接器，其特征在于：所述外遮蔽壳体设有遮覆绝缘本体后端的后壁，后壁边缘的两侧延伸出一对卡持臂，绝缘本体上设有一对卡持部与该卡持臂相配合。

5. 如权利要求 1 所述的电连接器，其特征在于：所述弹片包括位于内遮蔽壳体顶壁、底壁的第一弹片及位于内遮蔽壳体两侧壁的第二弹片，第一弹片自由端设有弯折形成的接触部，第二弹片包括有与绝缘本体的基部相抵靠的第一弯折部、设于其自由端的接触部及连接第一弯折部与接触部的第二弯折部。

6. 如权利要求 4 或 5 中任一项所述的电连接器，其特征在于：所述外遮蔽壳体设有与后壁相连接的底壁，该底壁上凹设有缺口，而内遮蔽壳体上设有与该外遮蔽壳体的缺口相通的缺口。

7. 如权利要求 6 所述的电连接器，其特征在于：所述内、外遮蔽壳体底壁都设有固持脚，内遮蔽壳体上的固持脚及导电端子都延伸通过内、外遮蔽壳体的缺口而焊接于电路板上。

8. 如权利要求 6 所述的电连接器，其特征在于：所述绝缘本体设有自基部延伸出的安装部，安装部延伸通过内、外遮蔽壳体的缺口安装于电路

板上，

9. 如权利要求 8 所述的电连接器，其特征在于：所述绝缘本体的安装部与基部间形成有狭槽，内遮蔽壳体收容于狭槽中。

10. 如权利要求 8 所述的电连接器，其特征在于：所述安装部靠近收容空间一端设有一台阶状固持部，外遮蔽壳体固持于该固持部与内遮蔽壳体间。

电连接器

【技术领域】

本实用新型是有关一种电连接器，尤指一种用来传输直流电的电源连接器。

【背景技术】

电连接器通常会经过反复的插拔过程，为了保证其连接的稳定性，两对接电连接器间需要具有足够的保持力。对于端子数较少的电连接器，特别是电源连接器，若以端子提供该保持力，需要配接端子具有足够强度和变形量，但是这样必然会增大电连接器的体积，不符合电连接器小型化发展的趋势。

美国专利公告第6,139,350号揭示了一种电连接器，其包括一绝缘本体、收容于绝缘本体内的若干端子及包覆在绝缘本体外的一遮蔽壳体。该遮蔽壳体两侧壁上设有若干弹片，这些弹片与对接连接器配合以提供对接两连接器间的保持力。然而，上述遮蔽壳体因设置若干弹片而设有较多的开口，其强度相对减小。

为了改善上述电连接器存在的缺陷，需要设计一种具有新型的遮蔽壳体结构的电连接器。

【实用新型内容】

本实用新型的目的在于提供一种电连接器，其采用了双遮蔽壳体的结构，保证了连接器间的对接保持力和连接器外部壳体的强度，反复插拔不易失效。

为实现上述目的，本实用新型采用如下技术方案：一种电连接器，其包括有绝缘本体、收容于绝缘本体内的若干导电端子，紧挨着的内遮蔽壳体及外遮蔽壳体，内遮蔽壳体包围形成一收容空间，内遮蔽壳体设有凸伸入上述收容空间的若干弹片，所述外遮蔽壳体包覆于上述内遮蔽壳体外，与内遮蔽壳体紧密抵靠。

与现有技术相比,本实用新型具有如下有益效果:该电连接器由于采用了双遮蔽壳体的结构,保证了连接器间的对接保持力和连接器外部壳体的强度,反复插拔不易失效。

【附图说明】

图1是本实用新型电连接器的立体组合图。

图2是图1所示电连接器另一角度的立体组合图。

图3是图1所示电连接器的立体分解图。

图4是图3所示电连接器另一角度的立体分解图。

【具体实施方式】

请参阅图1至图2,本实用新型电连接器1为呈近似圆柱体结构,其包括有绝缘本体10、若干端子20、内遮蔽壳体30及外遮蔽壳体40。

请进一步参阅图3及图4,绝缘本体10包括近似圆柱体状的基部11、自基部11前端面延伸而出的近似圆柱体状的一舌板12及自基部11底面延伸而出的一安装部13。若干端子槽道14沿水平方向贯穿基部11的前后两端,且延伸入舌板12和安装部13并沿竖直方向贯穿舌板12和安装部13。安装部13自其前端向后凹设有一缺口15,缺口15两侧设有一对台阶状固持部19,该安装部13后部两侧还设有一对卡持部17,自安装部13底面延伸出两定位柱16。安装部13与基部11间形成有狭槽18,

导电端子20为“L”形,设有一水平部21和一竖直部22,其收容于绝缘本体10的端子槽道14内。

内遮蔽壳体30包覆于绝缘本体10的外部,并与绝缘本体10的基部11紧密配合。该内遮蔽壳体30包括有水平相对设置的顶壁31与底壁32及竖直相对设置且与顶壁31及底壁32相连的两侧壁33。顶壁31、底壁32及两侧壁33与绝缘本体10的舌板12间形成有收容空间34。若干第一弹片35自顶壁31及底壁32向内延伸入收容空间34,该第一弹片35自由端设有弯折形成的接触部351。一对“弓”字形第二弹片36自两侧壁33弯折延伸而成,其包括有朝绝缘本体10的基部11方向凸伸的第一弯折部361、朝包覆于内遮蔽壳体30外的外遮蔽壳体40方向凸伸的第二弯折部362及设于其自由端的接触部363。底壁32还设有一固持脚37及一自其后端向前凹

设而成的缺口 38。

外遮蔽壳体 40 包覆于内遮蔽壳体 30 的外部，且两者紧密配合。该外遮蔽壳体 40 包括有水平相对设置的顶壁 41 与底壁 42、竖直相对设置且与顶壁 41 及底壁 42 相连的两侧壁 43 及竖直设置且与顶壁 41 相连的后壁 44。顶壁 41、底壁 42 及两侧壁 43 上分别于对应内遮蔽壳体的第一弹片 35 与第二弹片 36 的位置上设有开口 45。底壁 42 设有一自其后端向前凹设而成的缺口 46。两侧壁 43 的底缘向下延伸而成若干固持脚 47。后壁 44 底缘的两侧沿水平方向向前延伸出一对卡持臂 48。

请参阅图 1 及图 2，组装时，导电端子 20 自绝缘本体 10 后端插入端子槽道 14，导电端子 20 的竖直部 22 尾端延伸于绝缘本体 10 之外；然后，绝缘本体 10 的基部 11 自后向前组装入内遮蔽壳体 30，舌板 12 位于内遮蔽壳体 30 内，内遮蔽壳体 30 位于缺口 38 周围的边缘收容于狭槽 18，固持脚 37 收容于缺口 15，第二弹片 36 的第一弯折部 361 与基部 11 相抵靠；最后，将外遮蔽壳体 40 包覆于内遮蔽壳体 30 之外，外遮蔽壳体 40 位于缺口 46 周围的边缘收容于内遮蔽壳体 30 的底壁 32 与绝缘本体 10 的固持部 19 间的狭槽（未图示）内，后壁 44 覆盖绝缘本体 10 与内遮蔽壳体 30 的后部，卡持臂 48 与绝缘本体 10 的卡持部 17 相配合以帮助固定外遮蔽壳体 40，定位柱 16、导电端子 20 的竖直部 22 及内遮蔽壳体 30 的固持脚 37 都延伸通过缺口 46，并与外遮蔽壳体 40 的固持脚 47 一起焊接于电路板上（未图示）。如固持脚 37、47 与电路板上的接地路径相连，即可提供内外遮蔽壳体的接地功能。

当对接连接器（未图示）与电连接器 1 相对接时，对接连接器收容于收容空间 34，内遮蔽壳体 30 的第一及第二弹片 35、36 的接触部 351、352 与对接连接器相抵接以提供两连接器间的对接保持力，且第一及第二弹片 35、36 发生弹性变形而伸入外遮蔽壳体 40 的开口 45。

本实用新型电连接器 1 中，由于采用了双遮蔽壳体的结构，保证了连接器间的对接保持力和连接器外部壳体的强度，反复插拔不易失效。

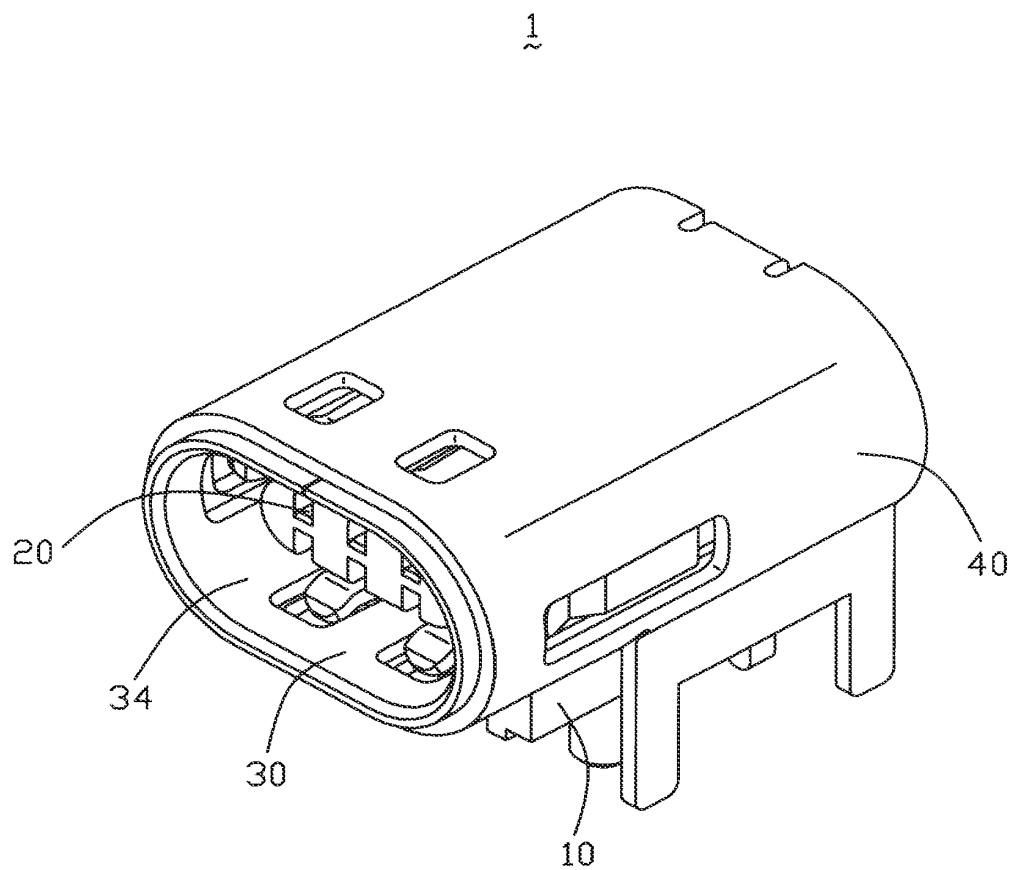


图 1

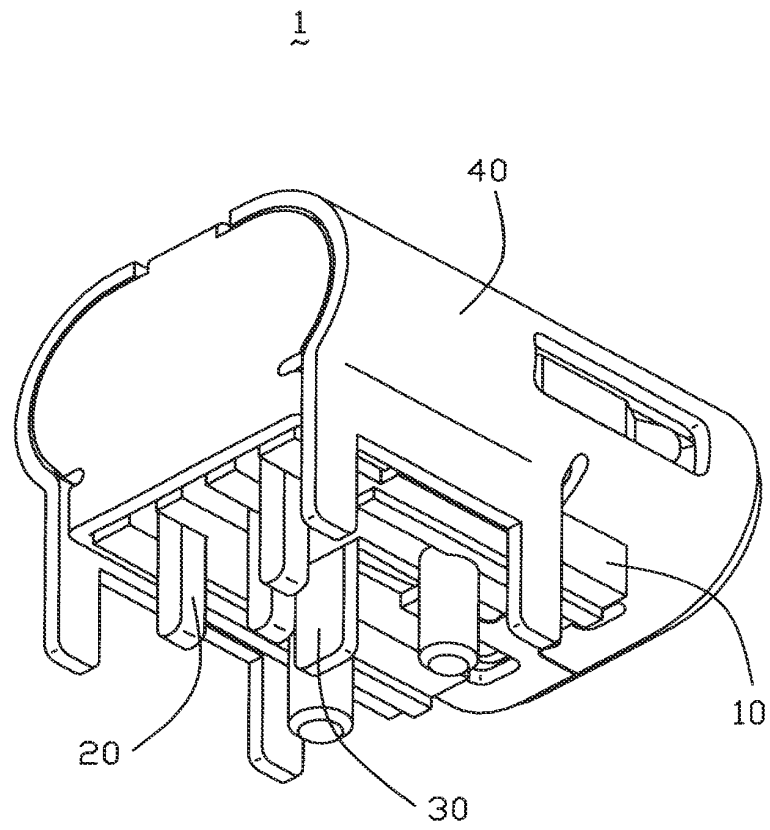


图 2

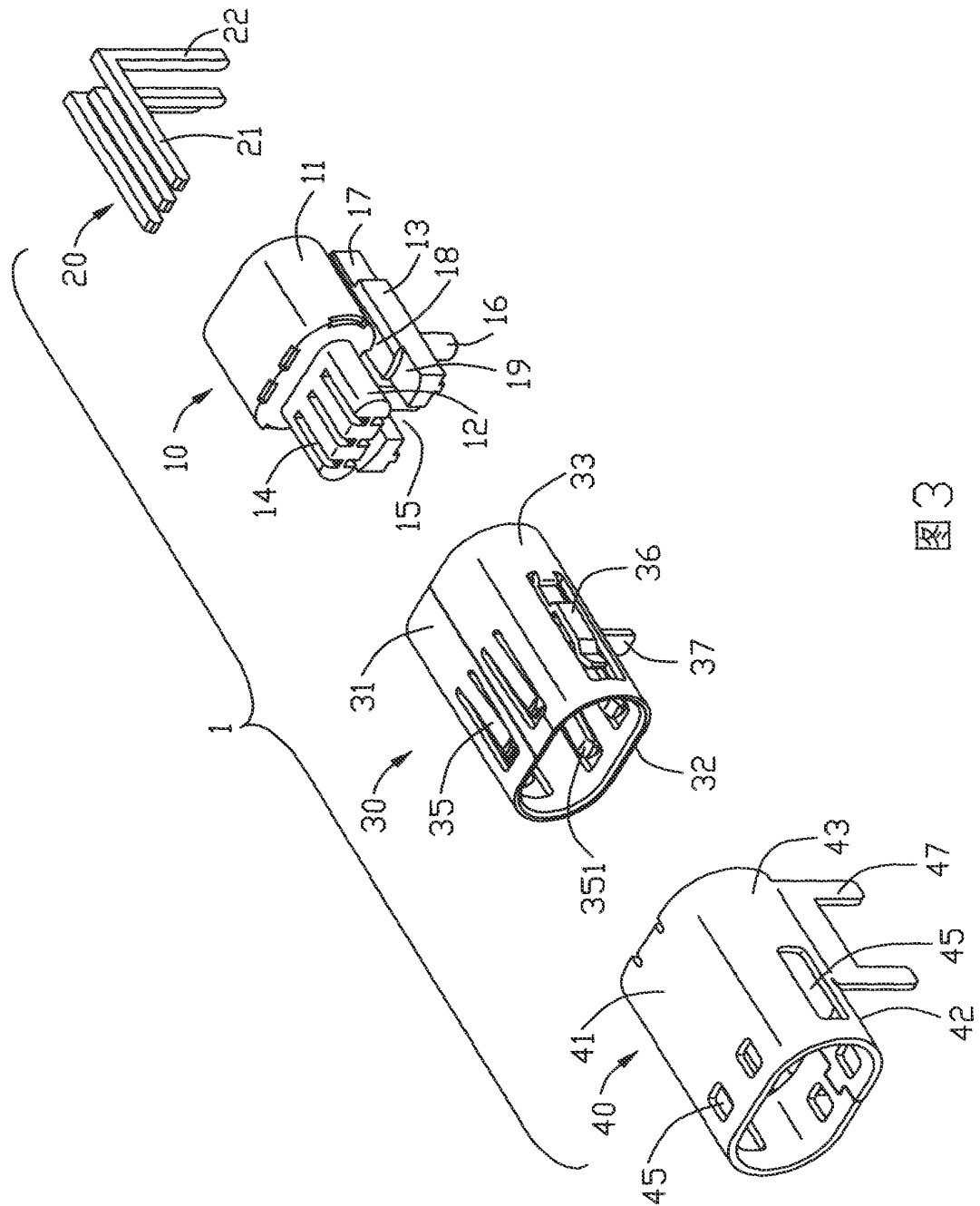


图3

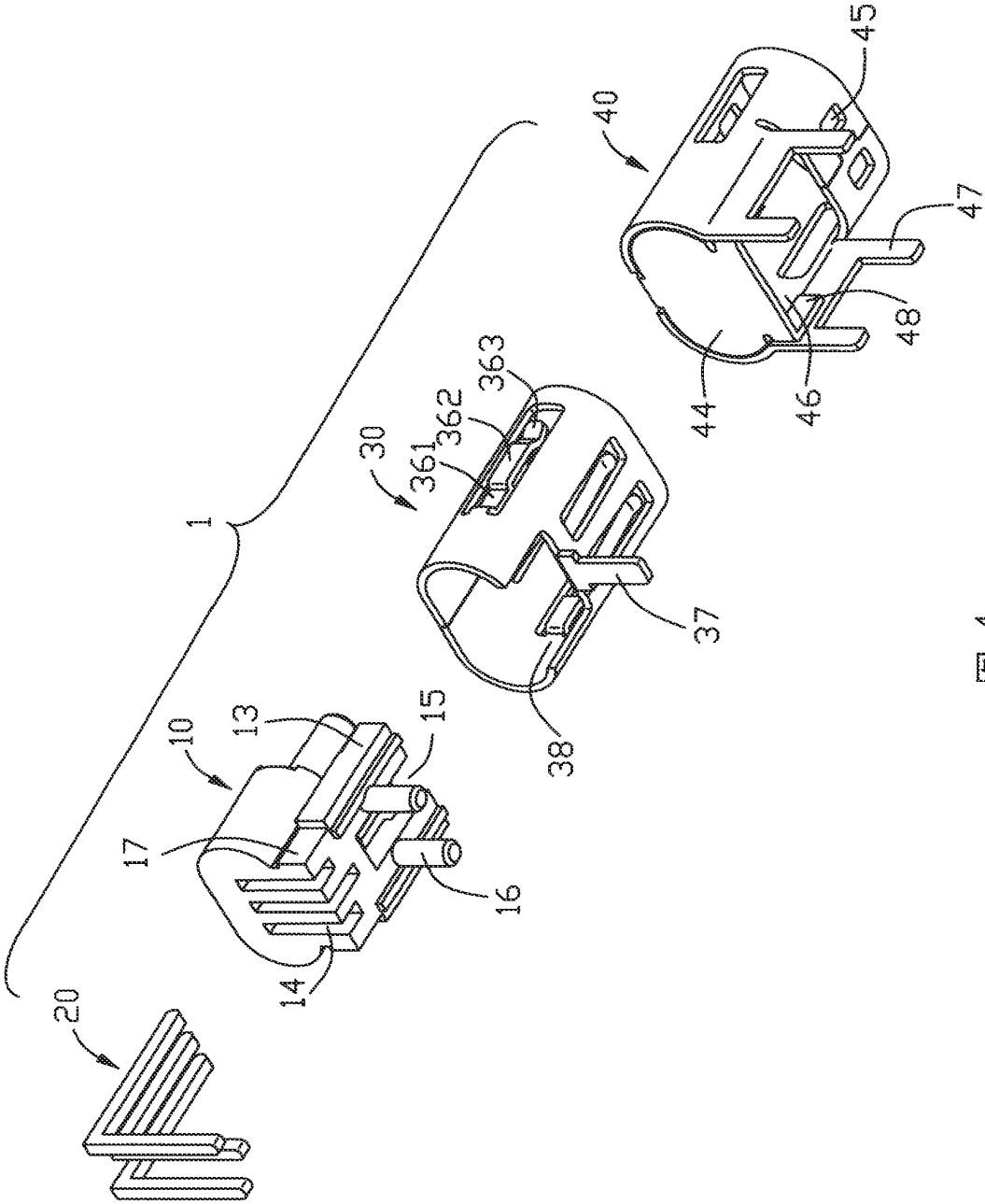


图 4



Espacenet

Bibliographic data: CN1370343 (A) — 2002-09-18**Multipolar connector for low-voltage devices**

Inventor(s): EICHHORN REINHOLD [DE]; HARMS MICHAEL [DE];
HOTTENROTT SEBASTIAN [DE] ± (REINHOLD EICHHORN, ;
MICHAEL HARMS, ; SEBASTIAN HOTTENROTT)

Applicant(s): BRAUN GMBH [DE] ± (BRAUN GMBH)

Classification: - **international:** H01R13/02; H01R13/642; H01R24/00; H01R24/60;
H01R29/00; (IPC1-7): H01R24/00; H01R29/00
- **cooperative:** H01R24/60 (EP, US); H01R29/00 (EP, US);
H01R2107/00 (EP, US)

Application number: CN20008011852 20000729

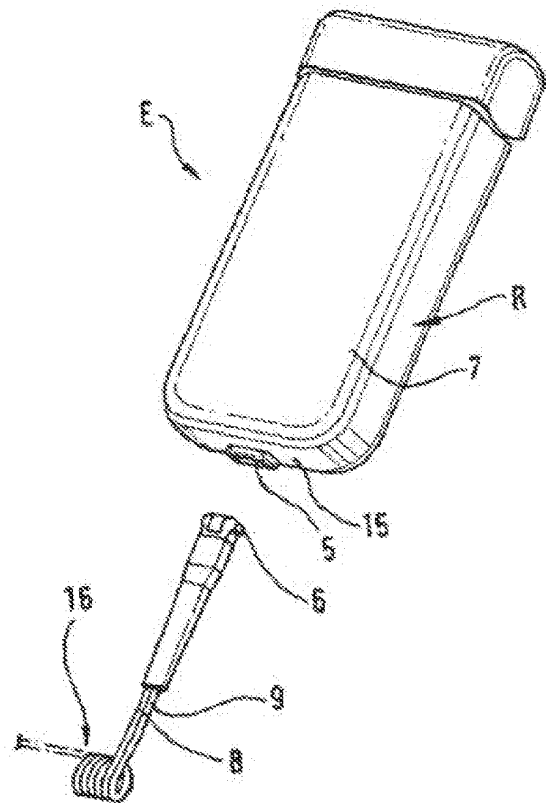
Priority number(s): DE19991040101 19990824

Also published as: ATE251351 (T1) AU6832900 (A) CN1202599 (C)
DE19940101 (A1) EP1206817 (A1) more

Abstract not available for CN1370343 (A)

Abstract of corresponding document: WO0115282 (A1)

The invention relates to a multipolar connector for connecting low voltage to an electrical device (E) for personal use, which comprises a plug (6) that can plugged-in into socket (5) and contact elements (1 to 4, 10, 20, 30, 40) that can be brought into contact for polarized voltage transmission, whereby the socket (5) and the plug (6) are embodied as polygonal profile bodies (M1 to M12) that can be reversibly connected around a symmetrical axis (S) from one plug-in position to at least another plug-in position. Each polygonal profile body (M1 to M12) includes contact elements (1 to 4, 10, 20, 30, 40) having at least one first pole (+) and a second pole (-). Said contact elements having a first pole (+) and a second pole (-) are provided in alternating sequences in peripheral direction (U) on the surfaces of the polygonal profile body (M1 to M12.). The contact elements on at least one of the polygonal profile bodies (M1 to M12) have a relatively large contact surface to enable surface contacting with the contact surface of a contact element (1 to 4, 10, 20, 30, 40) reaching the installation.



[19] 中华人民共和国国家知识产权局

[51] Int. Cl⁷

H01R 24/00

H01R 29/00

[12] 发明专利申请公开说明书

[21] 申请号 00811852.3

[43] 公开日 2002 年 9 月 18 日

[11] 公开号 CN 1370343A

[22] 申请日 2000.7.29 [21] 申请号 00811852.3

[30] 优先权

[32] 1999.8.24 [33] DE [31] 19940101.2

[86] 国际申请 PCT/EP00/07355 2000.7.29

[87] 国际公布 WO01/15282 德 2001.3.1

[85] 进入国家阶段日期 2002.2.20

[71] 申请人 布劳恩股份有限公司

地址 德国克龙贝格

[72] 发明人 赖因霍尔德·艾西霍恩 迈克尔·哈姆斯

塞巴斯蒂安·霍特罗特 彼得·容克

迈克尔·奥德默 延斯·施特克尔

罗兰·乌尔曼 于尔根·沃尔夫

[74] 专利代理机构 中原信达知识产权代理有限责任公司

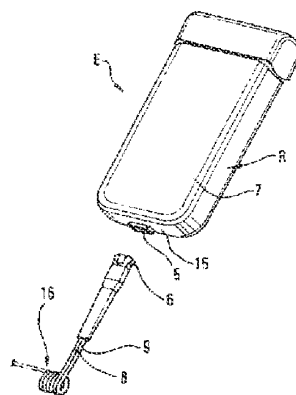
代理人 朱登河 顾红霞

权利要求书 5 页 说明书 12 页 附图页数 4 页

[54] 发明名称 低压电器的多极接插组件

[57] 摘要

本发明涉及一种多极接插组件,用于向个人电器(E)连接低电压,具有一个可插入进一个插座(5)的插头(6)并且具有可接触的接触元件(1至4、10、20、30、40)用于可分极性的电压传输,插座(5)和插头(6)构成可以从一个插入位置向至少另一个插入位置绕一个对称轴(S)翻转的多边形断面体(M1至M12)。在每个多边形断面体(M1至M12)上各设有至少一个第一极(+)和一个第二极(-)的接触元件(1至4、10、20、30、40)。所述有第一极(+)和第二极(-)的接触元件以交替的顺序沿一个转动的方向(U)安排在多边形断面体(M1至M12)的多边形断面体的面上。在多边形断面体(M1至M12)的至少一个上的接触元件有相对大的接触面以与接合的接触元件(1至4、10、20、30、40)形成大面积接触。



知识产权出版社出版

ISSN 1008-4274



权 利 要 求 书

1. 一种多极接插组件，用于向个人电器（E）连接低电压，具有一个可插入进一个插座（5）的插头（6）并且具有可接触的接触元件（1 至 4、10、20、30、40）用于可分极性的电压传输，其特征在于，插座（5）和插头（6）构成为可以从一个插入位置向至少另一个插入位置绕一个对称轴（S）翻转的多边形断面体（M1 至 M12），在每个多边形断面体（M1 至 M12）上各设有至少一个第一极（+）和一个第二极（-）的接触元件（1 至 4、10、20、30、40），第一极（+）和第二极（-）的接触元件以交替的顺序沿一个转动的方向（U）安排的多边形断面体（M1 至 M12）的多边形断面体的面上，并且在多边形断面体（M1 至 M12）的至少一个上的接触元件有相对大的接触面以与接合的接触元件（1 至 4、10、20、30、40）形成大面积接触。

2. 权利要求 1 的前序部分所述的接插组件，其特征在于，插座（5）和插头（6）构成为可以从一个插入位置向至少另一个插入位置绕一个对称轴（S）翻转的多边形断面体（M1、M2），在每个多边形断面体（M1、M2）上各设有一个第一极（+）和一个第二极（-）的接触元件（1、2、10、20），接触元件（1、2、10、20）的第一极（+）和第二极（-）以交替的顺序安排的多边形断面体（M1、M2）之一上，并且在相邻的多边形断面体（M1、M2）上有数量为（n）的第一极（+）的接触元件，或者数量为（n-1）的第二极（-）的接触元件（1、2、10、20）。

3. 权利要求 1 的前序部分所述的接插组件，其特征在于，至少一个接触元件（1 至 4）设在插头（6）的每个壁（51 至 54、59）上。

4. 权利要求 1 的前序部分所述的接插组件，其特征在于，至少一个接触元件（10、20、30、40）设在插座（5）的每个壁（55 至 58、

60) 上。

5 5. 权利要求 1 的前序部分所述的接插组件, 其特征在于, 至少两个第一极 (+) 的接触元件 (1) 以彼此对立的关系设在插头 (6) 的多边形断面体 (M1、M3、M5、M7) 上。

10 6. 权利要求 1 的前序部分所述的接插组件, 其特征在于, 至少两个第二极 (-) 的接触元件 (2) 以彼此对立的关系设在插头 (6) 的多边形断面体 (M1、M3、M5、M7) 上。

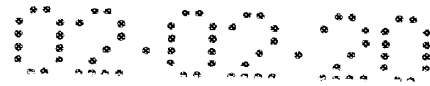
7. 权利要求 1 的前序部分所述的接插组件, 其特征在于, 至少两个第一极 (+) 的接触元件 (1) 以彼此对立的关系设在插座 (5) 的多边形断面体 (M2、M4、M6、M8) 上。

15 8. 权利要求 1 的前序部分所述的接插组件, 其特征在于, 至少两个第二极 (-) 的接触元件 (2) 以彼此对立的关系设在插座 (5) 的多边形断面体 (M2、M4、M6、M8) 上。

20 9. 以上权利要求任何之一所述的接插组件, 其特征在于, 第一极 (+) 和第二极 (-) 的接触元件 (1 至 4、10、20、30、40) 设在插头 (6) 和插座 (5) 的相对立和 / 或相邻的壁上。

25 10. 以上权利要求任何之一所述的接插组件, 其特征在于, 接触元件 (1、2、3、4) 设在插头 (6) 的多边形断面体 (M1、M3、M5、M7、M9、M11) 的至少两个壁 (51 至 54) 上。

30 11. 以上权利要求任何之一所述的接插组件, 其特征在于, 接触元件 (10、20、30、40) 设在插座 (5) 的多边形断面体 (M2、M4、M6、M8、M10、M12) 的至少两个壁 (57 至 58) 上。



12. 以上权利要求任何之一所述的接插组件，其特征在于，第一极（+）的两个接触元件（10）和第二极（-）的一个接触元件（20）设在多边形断面体（M2）之一上，并且第一极（+）的两个接触元件（1）和第二极（-）的两个接触元件（2）设在用于与之耦连的多边形断面体（M1）上。

13. 以上权利要求任何之一所述的接插组件，其特征在于，至少一个有一个第一极（+）和一个第二极（-）的接触元件（1、2）设在第一壁（51）上，并且在插头（6）和插座（5）的其它壁（52、53、54）上的接触元件（1、2）与设在第一壁（51）上的接触元件（1、2）以相同的极性次序安排。

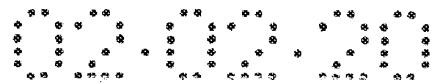
14. 以上权利要求任何之一所述的接插组件，其特征在于，插头（6）和插座（5）的多边形断面体由具有至少两个不同极性的接触元件的可翻转的四角断面体形成，并且第一极（+）和第二极（-）的接触元件以互相中心对称的关系设在插头（6）和插座（5）的壁上。

15. 以上权利要求任何之一所述的接插组件，其特征在于，插头（6）和插座（5）的多边形体断面体由可翻转的矩形断面体形成。

16. 以上权利要求任何之一所述的接插组件，其特征在于，插头（6）和插座（5）的多边形体断面体由可翻转的正方形断面体形成。

17. 以上权利要求任何之一所述的接插组件，其特征在于，插头（6）和插座（5）的多边形体断面体由可翻转的三角断面体形成。

18. 以上权利要求任何之一所述的接插组件，其特征在于，插头（6）和插座（5）的多边形体断面体由可翻转的五边形或六边形断面体形成。



19. 以上权利要求任何之一所述的接插组件，其特征在于，插头（6）的多边形体断面体至少有两个相互平行伸展的外壁，和其它连接上述外壁的合适形状的外壁以形成一个封闭体。

5 20. 以上权利要求任何之一所述的接插组件，其特征在于，插座（5）的多边形体断面体至少有两个相互平行伸展的外壁，和其它连接上述外壁的合适形状的外壁以形成一个封闭体。

10 21. 以上权利要求任何之一所述的接插组件，其特征在于，接触元件构成接触板。

22. 以上权利要求任何之一所述的接插组件，其特征在于，至少一个接触元件基本上是U字形构形的。

15 23. 以上权利要求任何之一所述的接插组件，其特征在于，至少一个接触元件基本上是L字形构形的。

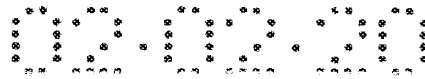
20 24. 以上权利要求任何之一所述的接插组件，其特征在于，在插头（6）和 / 或插座（5）的多边形体断面体设至少两个不同极性的U字形接触元件。

25. 以上权利要求任何之一所述的接插组件，其特征在于，插头 / 插座的多边形体断面体设至少两个不同极性的L字形接触元件。

25 26. 以上权利要求任何之一所述的接插组件，其特征在于，插头 / 插座的多边形体断面体至少一个壁是要弹簧加载的。

27. 权利要求 18 所述的接插组件，其特征在于，所述弹簧加载的壁装备有一个棘轮钩。

30



28. 权利要求 18 或 19 所述的接插组件，其特征在于，插座或插头的多边形体断面体至少两个相对壁是要用一个薄膜铰链弹簧加载的。

5 29. 权利要求 18 至 20 任何之一所述的接插组件，其特征在于，用于弹簧加载的壁适于用弹簧元件作用于其上。

30. 以上权利要求任何之一所述的接插组件，其特征在于，插头的多边形体断面体是一个电线的部分。

10

31. 以上权利要求任何之一所述的接插组件，其特征在于，插头的多边形体断面体是一个电器的部分。

32. 以上权利要求任何之一所述的接插组件，其特征在于，插座的多边形体断面体是一个电线的部分。

15

33. 以上权利要求任何之一所述的接插组件，其特征在于，插座的多边形体断面体是一个电器的部分。

20 34. 以上权利要求任何之一所述的接插组件，其特征在于，插头和插座的多边形体断面体是用于耦连在一起的两个电线的部分。

说明书

低压电器的多极接插组件

5 本发明涉及一种权利要求 1 的前序部分所述类型的多极接插组件。

10 开头所指类型的多极接插组件由德国标准“DIN45323, 1982 年 10 月公布”所公知。插头基本上含有一个固定在一个绝缘体中的接触套筒, 在插座与插头耦连时这个套筒由插座的一个弯曲的 V 字形接触弹簧接合。接触套筒的圆形结构和接触弹簧的 V 字形结构在这两个部件的接合区域内产生一个以点为基础的接触, 其结果是无法保证蓄电池充电和 / 或所连接的电器运转所需的较大电流的无损耗传输。

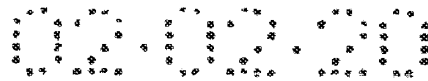
15 本发明的一个目的是改善开头所述的多极接插组件。

 根据本发明此目的由权利要求 1 所确定的特征实现。

20 达到本发明的目的的另一个方案由权利要求 2 所给出的特征说明。

25 本发明的一个基本优点是, 通过把插头和插座构成为可翻转的多边形断面体, 形成可以设有一或多个有较大的接触面积的接触元件的壁面, 用于与任何与之接合的接触元件进行大面积接触。通过在第一极的接触元件与同极性的接触元件之间的大面积接触, 以及在第二极的接触元件与同极性的接触元件之间的大面积接触, 可以保证大体上无损耗地传输相对大的电流, 尽管所述的多极接插组件的尺寸相对地小。接触元件表面的相对大的扩展区域保证了在它与与之接合的接触元件的接触面之间的大面积接触, 不论后者是平面的还是凸的还是角形的构形。把接合接触面做得适应于受接触弹簧的弹力的影响, 可以

30



5 保证在相对大的接触面与一个例如由单翼或多翼接触弹簧形成的接触元件之间的大面积接触。设在多边形断面体上的接触元件的正确的极之间的接触，通过适当地形成插座和插头的可互相配合的多边形断面体由插头和插座相对一个公共对称轴的可翻转性保证。通过相互正确接合而匹配的插头和插座的多边形断面体还保证插头和插座可以容易而且简单地连接和分开。

10 权利要求所提出的方案的一个基本优点是，不损害从电源，例如变压器，向电器的充电电路传输低电压地，有可能对多边形断面体之一，例如插座，设置一个第一极（+）或者第二极（-）的小的接触元件而不对电压传输有任何损害。

15 上述的两个方案的每个都能保证在所设的接触元件之间有足够的
大面积接触，以及保证同极性接触元件的可靠分配，即把第一极（+）分配给相邻的第一极（+）并且把第二极（-）分配给相邻的第二极（-），不论是在把插头插入插座时还是翻转插头从一个插入的位置转向到至少另一个插入位置。根据本发明的这两个方案允许有多种多样的不同实施例，每个都可以有利地实际应用。例如，一方面插头和插座的可互相配合的多边形断面体可以有不同的形状，另一方面插头和插座的多边形断面体可以根据需要设有几个接触元件，只要所述的带有边缘的多边形断面体可以通过正确接合而相互插在一起。

20 本发明的对象优选地适用于个人用电器，这些应用常常需要使用
者实现从电源，例如低压变压器，向电器的低电压传输，这种情况下重要的是使用者能够进行插头插座连接，确保电源以简单的方式具有相关连接中的正确极性，而不必注意怎样达到正确的极性连接。这种类型的电器具体有剃须刀、口腔保健器、电话，特别是移动电话、装有充电电池的手持电器等等。

30 本发明的一个优选实施例的特征在于至少一个接触元件设在插头



的每个壁上。

在该实施例的另一个方面，至少一个接触元件设在插座的每个壁上。

5

本发明的一个可经济地制造的，非常简单的实施例的特征在于，第一极的至少两个接触元件以相对的关系设在插头的多边形体断面体上。在这个实施例的另一个方面，第二电极的两个接触元件以相对的关系设在插头的多边形体断面体上。为了适应这个实施例，第一极的至少两个接触元件以相对的关系设在插座的多边形体断面体上，而第二电极的至少两个接触元件以相对的关系设在插座的多边形体断面体上。

10

根据本发明的另一个优选实施例，第一极和第二极的接触元件设在插头和插座的相对和 / 或相邻的壁上。

15

对于相对简单和低成本的接插组件，接触元件设在插头的多边形体断面体上的至少两个壁上就够了。为了适应这种实施例，接触元件设在插座的多边形体断面体上的至少两个壁上。

20

与由插头和插座可互相配合的多边形体断面体的强制接合元件形成的接插组件相联系，正确的接触由设在插头和插座上两个第一极性接触元件和第二极性的一个接触元件，并且在可耦连的多边形断面体上设有两个第一极性接触元件和第二极性的一个接触元件来得到保证。

25

本发明的一个优选的方案特征在于至少一个带有一个第一极性和一个第二极性的接触元件设在第一壁上，而在插头和插座的其它壁上的接触元件以与设在第一壁上的接触元件的极性相同的次序安排。

30



本发明的另一个优选的实施例特征在于插头和插座的多边形体断面体由可翻转的带有至少两个不同极性的接触元件的四边形断面体形成，其中第一极（+）和第二极（-）的接触元件以中心互相对称的关系设在插头和插座的壁上。

5

根据本发明的另一个优选的实施例插头和插座多边形体断面体由可翻转的矩形断面体形成。

10 根据本发明的一个优选的实施例插头和插座多边形体断面体由可翻转的正方形断面体形成。

根据本发明的又一个实施例插头和插座多边形体断面体由可翻转的三角断面体形成。

15 根据本发明的再一个实施例插头和插座多边形体断面体由可翻转的六边形断面体形成。

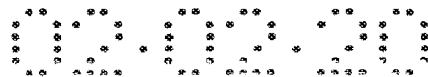
20 根据本发明的一个优选的实施例插头和插座多边形体断面体至少有两个相互平行伸展的外壁，和其它连接上述外壁的适合形状的外壁以形成一个封闭体。

根据本发明的一个优选实施例插座至少有两个相互平行伸展的内壁，和其它连接上述内壁的适合形状的壁以形成一个封闭体。

25 根据本发明的一个优选实施例接触元件构成为接触板。

根据本发明的一个优选实施例至少一个接触元件基本上是U字形构形的。

30 根据本发明的一个优选实施例至少一个接触元件基本上是L字形



构形的。

根据本发明的一个优选实施例提出在插头和/或插座的多边形体断面体设至少两个不同极性的U字形接触元件。

5

根据本发明的一个优选实施例提出在插头和/或插座的多边形体断面体设至少两个不同极性的L字形接触元件。

根据本发明的一个优选实施例提出插头和/或插座的多边形体断面体至少一个壁是要弹簧加载的。

根据本发明的一个优选实施例提出所述弹簧加载的壁装备有一个棘轮钩。

15 根据本发明的一个优选实施例提出在插座或插头的多边形体断面体至少两个相对壁是要用一个薄膜铰链弹簧加载的。

根据本发明的一个优选实施例提出用于弹簧加载的壁适于用弹簧元件作用于其上。

20

根据本发明的一个优选实施例提出插头的多边形体断面体是电线的一部分。

根据本发明的一个优选实施例提出插头的多边形体断面体是电器
25 的一部分。

根据本发明的一个优选实施例提出插座的多边形体断面体是电线的一部分。

30 根据本发明的一个优选实施例提出插座的多边形体断面体是电器

的一部分。

根据本发明的一个优选实施例提出插头和插座的多边形体断面体是用于耦连在一起的两个电线的部分。

5

从下面的说明和示出某些优选实施例的附图中可以清楚本发明的其它优点和细节。

图 1 是一个电器 E，具体地一个剃须装置 R 的透视图；

10 图 2 是一个电源适配器的透视图, 所述适配器有一个带有与剃须装置 R 的插座耦连用的插头的电线;

图 3 是一个在连接状态的插座和插头的透视图:

图 4 是一个插头和一个插座以及固定装置的分解图:

图 5 是一个插座和一个固定装置的全部部件的分解图;

15 图 6 是插头的全部部件的分解图:

图 6a 形成大表面积接合的两个接触元件的视图；以及

图 7 至 17 是互相配合的插头和插座的不同实施例的视图, 具体示出插头和插座的多边形断面体和在互相配合的多边形断面体之间各种接触的形状设计。

20

图 1 示出一个剃须装置 R 形式的电器 E 的透视图。在剃须装置 R 的壳 7 的壳底 15 中设有一个连接电线 16 的插头 6 的插座 5。

图 2 示出一个电源适配器 A 的透视图，所述适配器 A 有一个带有
25 与剃须装置 R 的插座 5 耦连用的插头 6 的电线 16。两个用于连接到电
源的插头销 13 和 14 设在电源适配器 A 上。电线 16 可以固定在电源
适配器 A 的适配器壳 12 中或者可以插入其中。电线 16 用于有极性地
传输电压。为此目的本实施例设有一个电流导线 8 用于向第一极（+）
30 的至少一个接触元件传输电压，并且设有一个电流导线 9 用于向第二
极（-）的至少一个接触元件传输电压。

面接合。还可以用两个 L 字形的接触元件 20 结合形成一个 U 字形的接触元件。通过一个 U 字形的接触元件可以得到两个可接触的面，这两个可接触的面可以提供为插头 6 和/或插座 5 的第一极（+）或第二极（-）的接触面。

5

固定装置 37 基本上包含一个后壁 46 和两个安排为彼此相向运动的端壁 47 和 48，及一个设在后壁 46 上与之成直角的支承壁 49。端壁 48 和 / 或端壁 47 的可移动性可以通过一个机械关节保证也可以借助于一个薄膜铰链把端壁 47 和 48 形成在后壁上保证。当接触元件 10 和 20 成套的插座壳 35 与固定装置 37 组装起来时，端壁 47 和 48 被一个 U 字形的弹簧元件 38 的弹簧支腿 26 和 27 迫向插座壳 35 的内部空间的方向。为了改善引导和把弹簧元件 38 保持在装置 37 上，在端壁 47 和 48 上设有凹陷 24 和 25 以容纳弹簧支腿 26 和 27。

图 6 示出插头 6 的构成为一个多边形断面 M1 的插头体 36 的透视图，在其侧壁上设有凹陷以容纳一个基本上为 U 字形的接触元件 1 和一个基本上为 U 字形的接触元件 2。彼此相对伸展的插头体 36 的相对窄的末端和与它们接合的 U 字形接触元件 2 的相应支腿阶梯形地凹陷以使插头 6 的阶梯形肩台提供一种与设在固定装置 37 的端壁 47 和 48 上的夹持片 28 和 29 配合的销锁作用，固定装置 37 一方面把插头 6 牢靠地卡在插座 5 内，另一方面使使用者方便地向插座 5 插入和从插座 5 取出插头 6。

图 6a 示出与一个刚性的接触元件 2 接合的一个弹性接触元件 20。利用接触元件 20 的弹性特性和伴随顺性在接触元件 20 和接触元件 2 之间得到了相对大面积的接合。参见图 5，如果接触元件 20 具有一种带翼片的结构，按照翼片数量在接触元件 20 与接触元件 2 之间形成几个大面积接触。

图 7 至 17 是互相配合的插头 6 和插座 5 的不同实施例的视图。

5 插头 6 的插头体 36 构成为一个多边形断面体 M1、M3、M5、M7、M9、M11，在其壁面 51、52、53、54 和 59 上设有不同数量的有第一极（+）也有第二极（-）的接触元件 1 到 4，从而第一极（+）和第二极（-）的接触元件以交替顺序沿一个转动方向 U 围绕对称轴 S 安排在相应的多边形断面体的面上。与插头 6 的各个多边形断面体 M1、M3、M5、M7、M9、M11 关联的是一个插座 5，其由壁面 51 至 60 形成的内部空间有多边形断面体 M2、M4、M6、M8、M10、M12 的形状，从而保证由强制接合插接在一起，也保证了图 7 至 17 中每个实施例中插头 6 和插座 5 的翻转。

10

在所述的多边形断面体 M1 至 M12 上设有第一极（+）和第二极（-）的接触元件 1 至 4、10、20、30、40，这样第一极（+）和第二极（-）的接触元件以交替顺序，即例如，极（+）、极（-）、极（+）、极（-）地，沿一个转动方向 U 围绕对称轴 S 安排在多边形断面体 M1 至 M12 的多边形断面体的面上。在图 7 至 17 所示的实施例中，接触元件 1 和接触元件 3 有正极（+），而接触元件 2 和接触元件 4 有负极（-）。接触元件在插座 5 和插头 6 的多边形断面体 M1 至 M12 的多边形断面体的面上的这种安排，与插头 6 和插座 5 由于强制接合的的互相配合结合，保证了把插头插入插座中时以及把它从一个插入位置翻转至至少另一个插入位置时都有正确极性的接触。

20

在图 7 至 15 的实施例中第一极（+）的极性分配给接触元件 1、3、10 和 30，而第二极（-）的极性分配给接触元件 2、4、20 和 40。另外，具有第一极（+）的极性的接触元件和具有第二极（-）的极性的接触元件，以相互中心对称的关系安排在插头 6 的多边形断面体 M1、M3、M5、M7 的壁面和多边形断面体 M2、M4、M6、M8 的多边形断面体的面上。这个规律的唯一例外是图 8 实施例的多边形断面体 M2，它只在多边形断面体的一个窄侧有一个接触元件 20。

25

30 图 7 示出插头 6 和插座 5，其可翻转的多边形断面体 M1 和 M2

5 构成矩形断面。在多边形断面体 M1 的宽侧设有一个第一极（+）的相应接触元件 1，在多边形断面体 M2 的相对的窄侧上设有一个第二极（-）的相应接触元件 2。匹配到以合形配合多边形断面体 M1 并且由壁面 55 至 58 确定的插座 5 的多边形断面体 M2 在其每个纵侧上有第一极（+）的相应的接触元件 10，而在彼此反向伸展的窄侧上有第二极（-）的相应的接触元件，从而，保证了在这两个多边形断面体 M1 和 M2 插在一起时以及把多边形断面体 M1 在插座 5 的多边形断面体 M2 内翻转时在第一极（+）的接触元件 1、10 与第二极（-）的接触元件 2、20 之间都有正确极性的接触。

10

图 8 的实施例示出一个多边形断面体 M1，其断面和与接触元件 1、2 的接触与对图 7 的多边形断面体 M1 的实施例一致。插座 5 的多边形断面体 M2 大体上与图 7 的 M2 实施例一致。然而，与此实施不同，在多边形断面体 M2 上没有设一个接触元件 20。但是还是能保证与插头 6 的多边形断面体的接触元件正确极性的接触。

15

图 9 示出一个结合图 7 说明的多边形断面体 M1 的一个实施例和插头 6 的多边形断面体 M2 一个实施例，此插头 6 的多边形断面体 M2 上，与图 7 不同，第一极（+）的接触元件和第二极（-）的接触元件以相互中心对称的关系安排在两个壁面 51 和 52 上。同样的安排也设在插座 5 的多边形断面体 M2 上，从而当多边形断面体 M1 与多边形断面体 M2 耦连时，保证在有第一极（+）极性的接触元件之间的正确接触和在有第二极（-）极性的接触元件之间的正确接触。

20

25 图 10 示出多边形断面体 M1 和多边形断面体 M2 之间接触的另一个实施例，在每个纵侧上设有另一个有第一极（+）极性的接触元件 3，并且在多边形断面体 M2 上设有另一个有第二极（-）极性的接触元件 30。

30

图 11 的接触元件的安排与图 10 的实施例不同处在于，在多边形

5 断面体 M1 的窄侧的壁面 53、54 上设有另一个有第二极（-）极性的接触元件 4，而在多边形断面体 M2 的窄侧的壁面 57、58 上设有一个有第二极（-）极性的接触元件 40。当插头 6 与插座 5 在耦连状态时正确极性的接触的保证在于，有第一极（+）极性的接触元件和有第二极（-）极性的接触元件以交替的顺序沿转动方向 U 安排在多边形断面体 M1，即 1、2、3、/ 4 / 1、2、3/4- 和 M2- 即 10、20、30/40/10、20、30/40 的多边形断面体的面上。

10 图 12 的实施例示出基本上为矩形结构的多边形断面体 M3 和 M4，多边形断面体 M3 的窄侧的壁面 53、54 是凹的，而多边形断面体 M4 的窄侧的壁面 57、58 是凸的。在多边形断面体 M3 和 M4 之间的接触与图 7 所示的多边形断面体 M1 和 M2 之间的接触一致。图 13 的多边形断面体 M5 和 M6 的实施例与图 12 所示的多边形断面体 M3 和 M4 的区别仅在于基本上为矩形的多边形断面体 M5 的窄侧的壁面 15 53、54 是凸的，而多边形断面体 M6 的窄侧的壁面 57、58 是凹的。

20 在图 14 和 15 的实施例中插头 6 的多边形断面体 M7 和插座 5 的多边形断面体 M8 由可翻转的正方形断面体构成。在图 14 的实施例中每个壁面 51 至 54 和 55 至 58 上各设有一个有第一极（+）极性的接触元件 1、10 和有第二极（-）极性的接触元件 2、20，使它们以相互中心对称的关系安排。在图 15 的实施例中每个壁面 51 至 58 上各设有另一个有第一极（+）极性的接触元件 3、30 与另一个有第一极（+）极性的接触元件 3、30 成中心对称的关系，从而当把插头 6 在插座中翻转过 90 和 180 度的两种情况下都保证在所设的接触元件 25 之间有正确极性的接触。

30 图 16 的实施例中插头 6 和插座 5 的多边形断面体由三角形的多边形断面体形成，这种三角形的多边形断面体可以绕对称轴 S 翻转，并且有相等的边壁。插头 6 在插座 5 中的正确极性的插入和翻转的保证在于在每个壁面 51、52、53 上各设有一个第一极（+）的接触元

件和一个第二极（一）的接触元件，使这些接触元件以交替的顺序沿一个转动方向U安排在多边形断面体 M9 和 M10 的多边形断面体的面上。

- 5 根据图 17，插头 6 的多边形断面体 M11 和插座 5 的多边形断面体 M12 构成为可以翻转的五边形断面体。在壁面 51、52、53、54、59 与 55、56、57、58、60 之间的接触通过在每个壁面上各设一个第一极（+）的接触元件和第二极（一）的接触元件，以接触元件按相同和不同极性用交替的顺序沿转动方向 U 安排而实现。

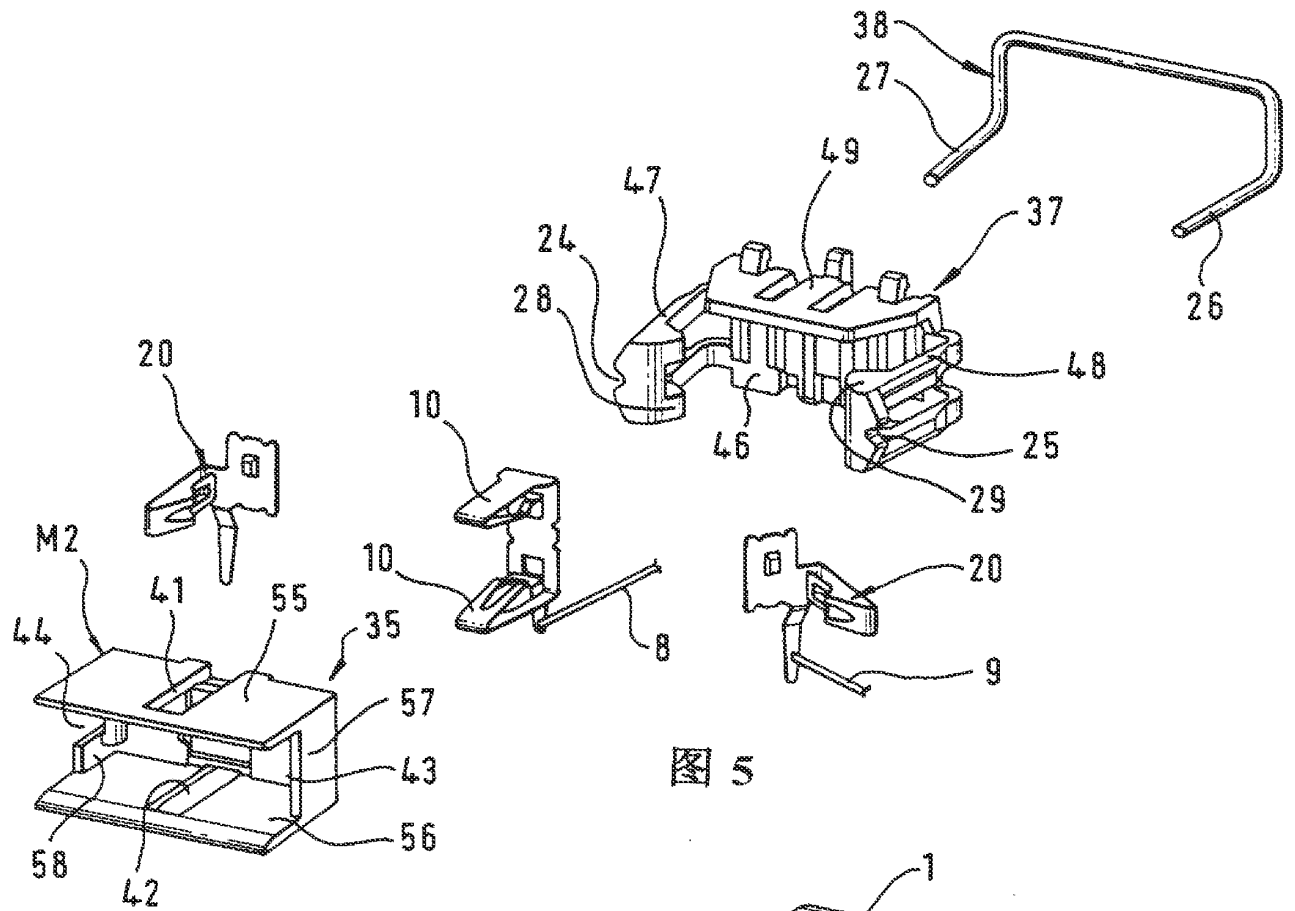


图 5

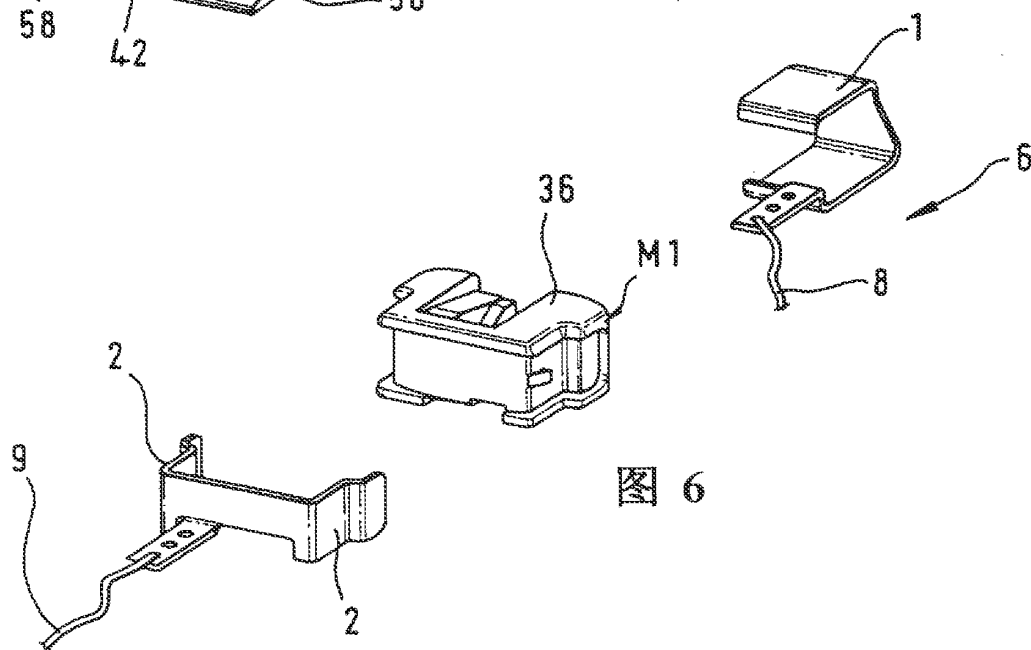


图 6

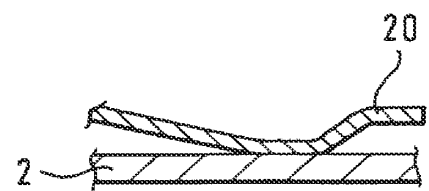


图 6a

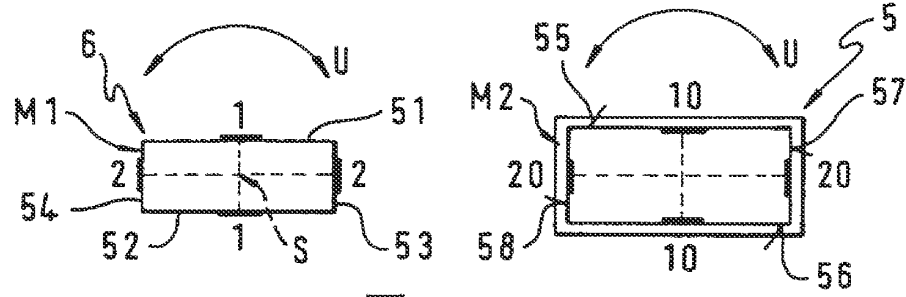


图 7

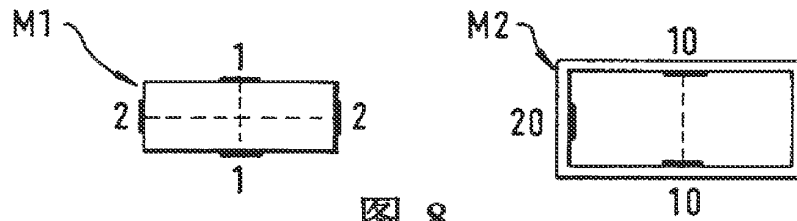


图 8

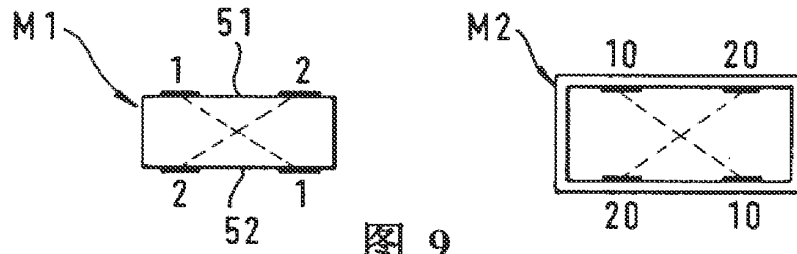


图 9

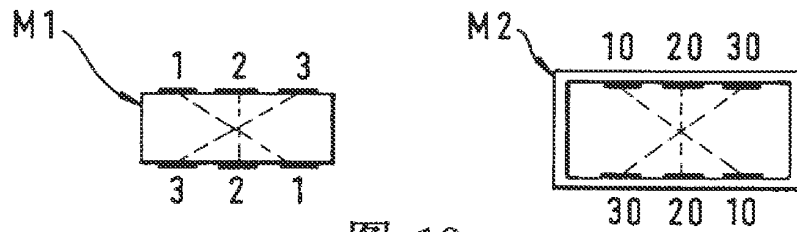


图 10

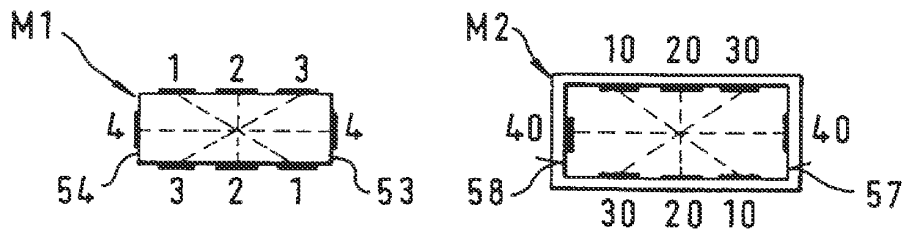


图 11

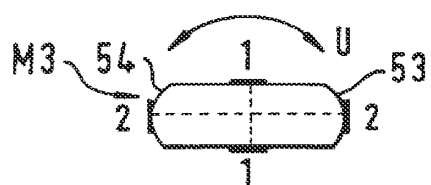


图 12

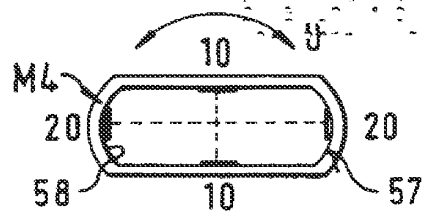
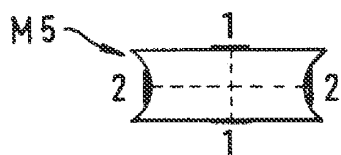
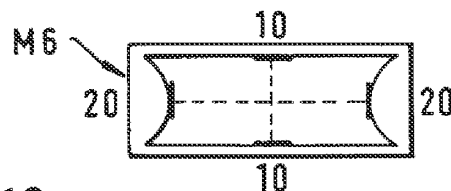


图 13

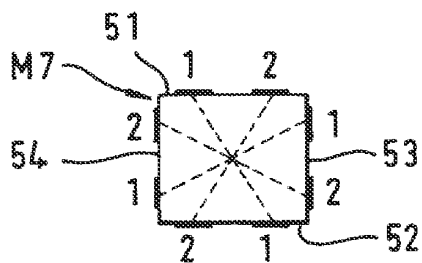
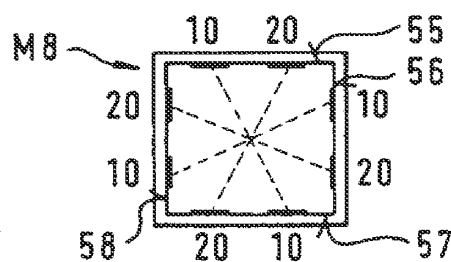


图 14

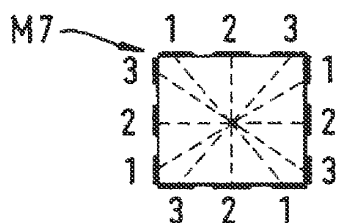
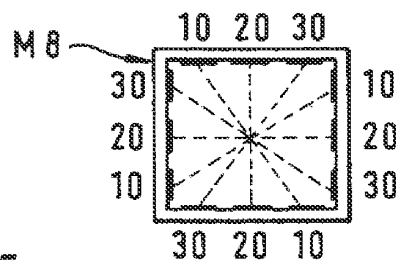


图 15

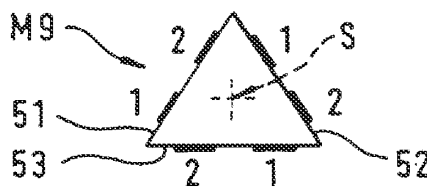
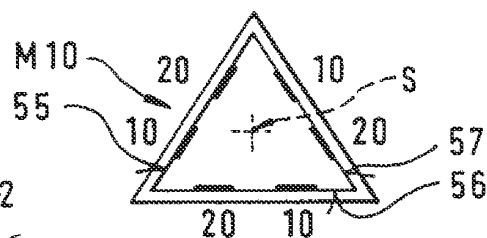


图 16

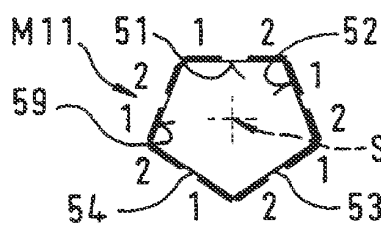
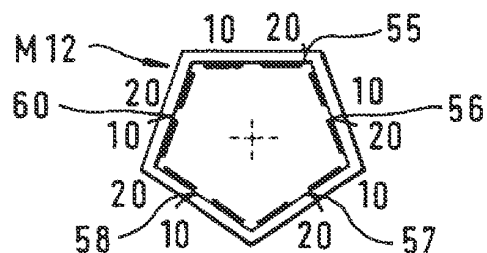
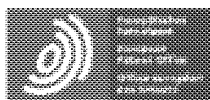


图 17



Espacenet

Bibliographic data: CN201038524 (Y) — 2008-03-19**Double-face universal serial bus interface**

Inventor(s): ZHENYU SUN [CN] ± (SUN ZHENYU)
Applicant(s): ZHENYU SUN [CN] ± (SUN ZHENYU)
Classification: - **international:** *H01R13/40; H01R13/70*
- **cooperative:**
Application number: CN20062016890U 20060711
Priority number(s): CN20062016890U 20060711

Abstract of CN201038524 (Y)

The utility model relates to a double-surface USB interface which can be inserted into the USB socket of the computer in the positive and negative directions. The utility model has two sets of standard USB interfaces contacts which can be inserted into the standard USB socket without any distinguish in the directions. The ordinary USB interface can only be inserted into the standard USB socket in a single direction, while the interface of the utility model can works normally when inserted into the USB socket without any distinguish in the directions due to the arrangement of the two sets of standard USB interfaces contacts. The USB socket the interface of the utility model is solid, with the contacts exposed to the outside and a set of contacts are respectively placed on the front and the back surfaces. The contacts are connected into the apparatus through the switches according to the particular needs in application. The other inside contact structure has the cross section being hollow, and the two inner walls of the shell each have a set of standard USB interfaces contacts. The double-surface USB interface can be fully contained by the standard socket, and the two structures both can be connected with the standard USB socket, with the use convenient and small in volume.

[19] 中华人民共和国国家知识产权局



[12] 实用新型专利说明书

专利号 ZL 200620016890.6

[51] Int. Cl.

H01R 24/06 (2006.01)

H01R 13/40 (2006.01)

H01R 13/70 (2006.01)

[45] 授权公告日 2008 年 3 月 19 日

[11] 授权公告号 CN 201038524Y

[22] 申请日 2006.7.11

[21] 申请号 200620016890.6

[73] 专利权人 孙振宇

地址 518052 广东省深圳市南山区桃园路常兴广场西座 25F

[72] 发明人 孙振宇

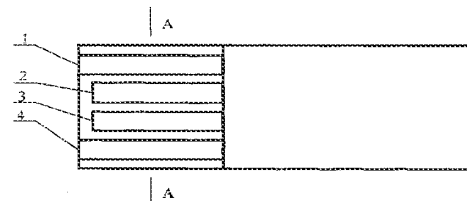
权利要求书 1 页 说明书 2 页 附图 1 页

[54] 实用新型名称

双面通用串行总线接口

[57] 摘要

一种能够正反两个方向接入计算机 USB 插座的双面通用串行总线(USB)接口。有两组标准 USB 接口触点,可以不区分方向插入标准 USB 插座中。普通的 USB 接口只能一个方向插入标准 USB 插座,而本接口由于具有两组对称触点,因此可以不区分方向地插入 USB 插座中正常使用。本接口一种是实心结构,外露触点,正反每个面上具有一组标准接触点,触点在某些应用需要通过开关后再连接到设备中。另一种截面为中空的内藏触点结构,壳体的两个内壁各具有一组标准接触点。双面 USB 接口完全兼容标准插座,两种结构都可以和标准 USB 插座良好结合,使用方便,体积小。



1. 双面通用串行总线接口，其特征是：具有两个接触面，每个面都带有一组通用串行总线接口的标准触点或部分标准触点。
2. 根据权利要求1所述的双面通用串行总线接口，其特征是：接口的一个面具有USB接口，翻转180度后有另外一个USB接口。
3. 根据权利要求1所述的双面通用串行总线接口，其特征是：每个接触面都有一组USB的触点，两组接触点是中心对称的。
4. 根据权利要求1所述的双面通用串行总线接口，其特征是：标准触点可以使用开关把两个面的触点进行隔离，防止可能出现的触点短路。

双面通用串行总线接口

所属技术领域

本实用新型涉及一种通用串行总线（USB）接口，尤其是具有两组标准接触点的通用串行总线（USB）接口。

背景技术

目前，公知的通用串行总线接口是由一组接口接触点构成，分布在接口的一个面上，接触点与所连接的设备连接而进行通讯和取得电源供电。但是，由于公知的通用串行总线（USB）接口只有一组单面触点，在进行连接时必须分清楚连接方向，给使用带来不方便，如果插反还可能导致被连接设备不正常工作甚至损坏。

发明内容

为了克服现有的通用串行总线（USB）接口必须分清接入方向的不足，本实用新型提供一种接口，该接口不需要分方向而直接插到设备上，就可以方便的使用。

本实用新型解决其技术问题所采用的技术方案是：采用两组标准通用串行总线（USB）接口接触点，每个面上都有标准触点，这样就可以在一个方向上正常接入设备，翻转180度后也可以正常接入设备，从而使用时不需要象公知USB接口一样需要区分方向。采用外露式触点结构时，为防止部分实施情况中可能出现的短路现象，可以使用开关把两个面的触点进行隔离；也可以采用两组内藏式触点结构，利用这种结构防止可能出现的短路。这样，当正面的通用串行总线（USB）标准触点进行连接时，背面的触点和正面的连接关系是被断开的，从而任何一个面的触点进行接触的时候，另外一个面都不会和正在连接的触点短路。本实用新型可以采用的技术方案有外露触点结构，内藏触点结构等具体方式。

本实用新型的有益效果是，可以在不用区分通用串行总线（USB）接口的方向而直接进行方便的连接，并杜绝公知接口可能的反接，不但使用方便并且可以防止意外接反而导致被接入设备不正常甚至损坏，并且由于结构对称，使产品的外观设计更方便和美观。

附图说明

下面结合附图和实施例对本实用新型进一步说明。

图1是本实用新型的外露触点接口机构的接口正视图。

图2是本实用新型的外露触点接口机构的接口剖面图。

图3是本实用新型的内藏触点接口机构的接口正视图。

图4是本实用新型的内藏触点接口机构的接口剖面图。

图5是本实用新型的外露触点USB闪存盘（U盘）实施例的正面视图。

图6是本实用新型的外露触点USB闪存盘（U盘）实施例的接口部分的剖面图。

图7是本实用新型的外露触点USB闪存盘（U盘）实施例的反面视图。

图 1 中, 1. USB 接口正面地电极, 2. USB 接口正面数据电极 1, 3. USB 接口正面数据电极 2, 4. USB 接口正面电源电极, 9. 开关。

图 2 中, 5. USB 接口正面地电极, 6. USB 接口正面数据电极 1, 7. USB 接口正面数据电极 2, 8. USB 接口正面电源电极。

图 4 中, 1. USB 接口正面地电极, 2. USB 接口正面数据电极 1, 3. USB 接口正面数据电极 2, 4. USB 接口正面电源电极, 5. USB 接口正面地电极, 6. USB 接口正面数据电极 1, 7. USB 接口正面数据电极 2, 8. USB 接口正面电源电极。

图 5 中, 1. USB 接口正面地电极, 2. USB 接口正面数据电极 1, 3. USB 接口正面数据电极 2, 4. USB 接口正面电源电极。

图 6 中, 1. USB 接口正面地电极, 2. USB 接口正面数据电极 1, 3. USB 接口正面数据电极 2, 4. USB 接口正面电源电极, 5. USB 接口背面地电极, 6. USB 接口背面数据电极 1, 7. USB 接口背面数据电极 2, 8. USB 接口背面电源电极。

图 7 中, 5. USB 接口背面地电极, 6. USB 接口背面数据电极 1, 7. USB 接口背面数据电极 2, 8. USB 接口背面电源电极。

具体实施方式

图 1 和图 2 表述的是本实用新型采用外露接触点的结构, 在实心的接口体的每个面分布了一组 USB 的标准接触点, 其中图 1 中的 USB 接口正面地电极 (1), 正面数据电极 1 (2), 正面数据电极 2 (3), 正面电源电极 (4) 是一组完整的 USB 接口触点。图 2 中则可以看到 USB 接口反面地电极 (5), 反面数据电极 1 (6), 反面数据电极 2 (7), 反面电源电极 (8) 是另外一组完整的 USB 接口触点。正面和反面的触点根据实际应用的设备, 可以使用全部接触点, 也可以使用部分接触点。对于一些具体应用, 有些接触点可以直接连接在一起, 有些需要使用开关 (9) 来切换。

图 3 和图 4 表述的是本实用新型采用内藏接触点的结构, 在空心的接口体的每个面分布了一组 USB 的标准接触点, 其中图 4 中的 USB 接口右面地电极 (1), 右面数据电极 1 (2), 右面数据电极 2 (3), 右面电源电极 (4) 是一组完整的 USB 接口触点。图 4 中的 USB 接口左面地电极 (5), 左面数据电极 1 (6), 左面数据电极 2 (7), 左面电源电极 (8) 是另外一组完整的 USB 接口触点。右面和左面的触点根据实际应用的设备, 可以使用全部接触点, 也可以使用部分接触点。对于一些具体应用, 有些接触点可以直接连接在一起, 有些需要使用开关来切换。

图 5、图 6 和图 7 是本实用新型的可以双面插入的 U 盘外露接口的实施例。图 5 正面视图中, USB 接口正面地电极 (1), 正面数据电极 1 (2), 正面数据电极 2 (3), 正面电源电极 (4) 是一组完整的 USB 接口触点。图 6 的 USB 接口的剖面图中, 显示了正面和背面接触点的分布情况。图 7 是本实用新型的背面视图, 可以看到背面的接触点 5、6、7、8, 分布情况和正面是一样的, 是中点对称的。U 盘的内部电路可以是任何的 U 盘电路。

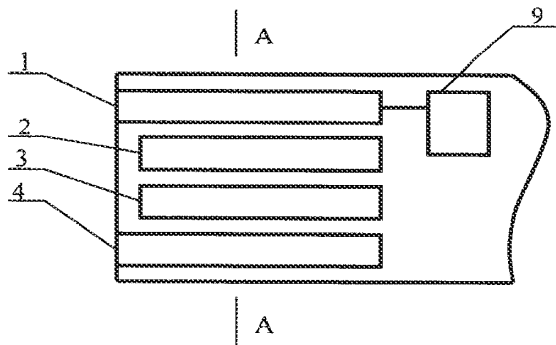


图 1

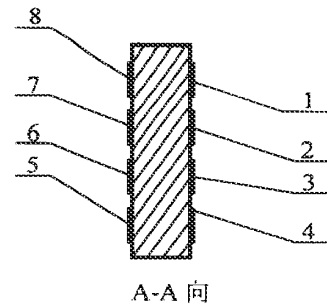


图 2

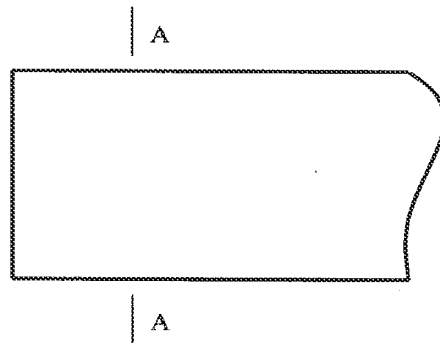


图 3

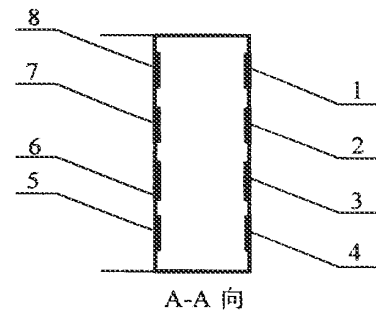


图 4

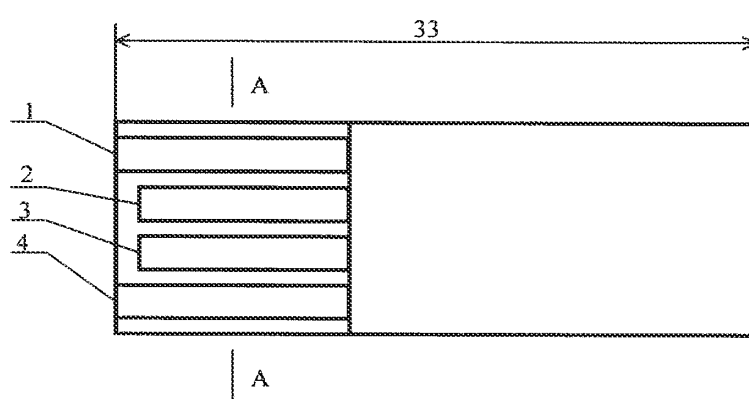


图 5

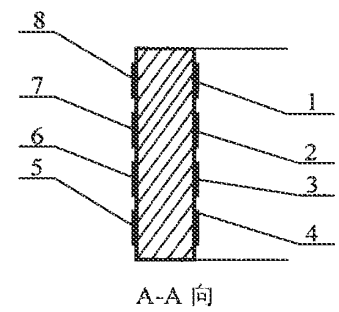


图 6

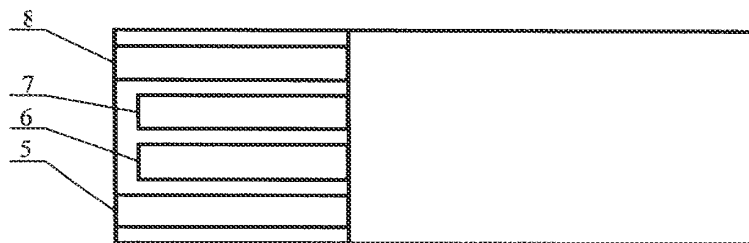
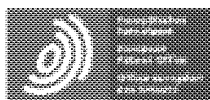


图 7



Espacenet

Bibliographic data: CN201352641 (Y) — 2009-11-25

Electric connector

Inventor(s): ZHOUXIAN CAI [CN] ± (CAI ZHOUXIAN)
Applicant(s): ZHOUXIAN CAI [CN] ± (CAI ZHOUXIAN)
Classification: - **international:** *H01R13/502; H01R13/516*
- **cooperative:**
Application number: CN200820181741U 20081222
Priority number(s): CN200820181741U 20081222

Abstract of CN201352641 (Y)

The utility model relates to an electric connector, comprising a metal outer seat, a plastic inner seat and a metal upper cover. The metal outer seat is provided with a bottom surface the middle of which is provided with an open area. One end of the metal outer seat is provided with a first pivot joint part. The plastic inner seat is arranged on the metal outer seat, which is provided with a plurality of terminal slots. The metal upper cover is provided with a top surface the middle of which is provided with the open area. One end of the metal upper cover is provided with the pivot joint part which is connected with the first pivot joint part of the metal outer seat by a pivot so that the metal upper cover and the metal outer seat can do pivotal rotation. At least one of the metal outer seat and the metal upper cover is provided with at least one break conformation so that the open area becomes an unclosed area and is communicated with outside. With the conformation, the metal outer seat or the metal upper cover changes the open area into the unclosed area via the break conformation, thus the material can be saved in the manufacture process.

[19] 中华人民共和国国家知识产权局

[51] Int. Cl.

H01R 13/502 (2006.01)

H01R 13/516 (2006.01)



[12] 实用新型专利说明书

专利号 ZL 200820181741.4

[45] 授权公告日 2009 年 11 月 25 日

[11] 授权公告号 CN 201352641Y

[22] 申请日 2008.12.22

[21] 申请号 200820181741.4

[73] 专利权人 蔡周贤

地址 中国台湾台北县

[72] 发明人 蔡周贤

[74] 专利代理机构 永新专利商标代理有限公司

代理人 李树明

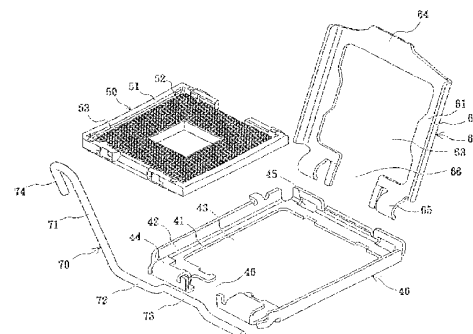
权利要求书 2 页 说明书 6 页 附图 11 页

[54] 实用新型名称

电连接器

[57] 摘要

一种电连接器，其包括有：一金属外座，其设有一底面，该底面中间设有一透空区，其一端设有一第一枢接部；一塑胶内座，其是设于该金属外座上，其上设有多个端子槽；及一金属上盖，其设有一顶面，该顶面中间设有一透空区，其一端设一枢接部，该枢接部与该金属外座的第一枢接部枢接，使金属上盖可与金属外座作枢转；该金属外座和金属上盖两者至少其中之一设有至少一断开构造，使其透空区成一非封闭区而与外界相通；借由以上构造，该金属外座或金属上盖借由该断开构造使其透空区成一非封闭区，如此在制造上可达到节省材料。



1. 一种电连接器，包括有：

一金属外座，其设有一底面，该底面中间设有一透空区，其一端设有一第一枢接部；

一塑胶内座，其是设于该金属外座上，其上设有多个端子槽；及

一金属上盖，其设有一顶面，该顶面中间设有一透空区，其一端设一枢接部，该枢接部与该金属外座的第一枢接部枢接，使金属上盖可与金属外座作枢转；

其特征在于：该金属外座和金属上盖两者至少其中之一设有至少一断开构造，使其透空区成一非封闭区而与外界相通。

2. 如权利要求1所述的电连接器，其特征在于：该金属外座的两侧皆设有向上的两侧面，该金属上盖的两侧皆设有向下的两侧面。

3. 如权利要求1所述的电连接器，其特征在于：还设有一摇杆，该金属上盖的另一端设有一凸片，该金属外座的另一端设有一第二枢接部，该摇杆设有相互呈垂直的第一杆及第二杆，该第二杆枢接于金属外座的第二枢接部且其弯曲形成一凸杆，该金属上盖盖合于金属外座上时该凸片被该凸杆所压制。

4. 如权利要求1所述的电连接器，其特征在于：该断开构造为一缺口。

5. 如权利要求4所述的电连接器，其特征在于：该缺口设于金属上盖的一端。

6. 如权利要求4所述的电连接器，其特征在于：该缺口设于金属外座的一端。

7. 如权利要求4所述的电连接器，其特征在于：该金属上盖于设有枢接部的一端设有一缺口，该金属外座相对于第一枢接部的另一端设有一缺口。

8. 如权利要求4所述的电连接器，其特征在于：该金属外座于两端皆各设有一缺口，使金属外座分开成两个半座，两半座各设有至少一个固定部与该塑胶内座固定。

9. 如权利要求1所述的电连接器，其特征在于：还设有一连接片固定于设有该断开构造的金属外座或金属上盖，借以连结该断开构造的两边。

-
10. 如权利要求 1 所述的电连接器，其特征在于：该塑胶内座上设有凸出的周缘而形成一放置区，该多数的端子槽排列设于该放置区内且对应该透空区。

电连接器

【技术领域】

本实用新型是有关于一种电连接器，特别是关于一种具有金属上盖及金属外座的电连接器。

【背景技术】

晶片(如CPU)的底面形成有数个间隔排列的接点，而连接该型式晶片的电连接器是利用一下压力将晶片固定于一座体上，借以使晶片的接点与排列于座体的端子槽内的端子弹性接触而确保电连接。

请参阅图1、图2、及图3，为一种连接晶片的电连接器，其是设有一金属外座10、一塑胶内座20、一金属上盖30、及一摇杆25，其中：

该金属外座10设有一底面11及两侧壁12，该底面11的中央内形成一透空区13，另其后端设有第一枢接部14，而前端设有呈孔状的第二枢接部15，另外，其一侧设有定位片16。

该塑胶内座20是套合于该金属外座10内，其上端的周缘设有向上的凸缘21而围成一放置一晶片37的放置区22，该放置区内间隔排列设有多个端子槽23，该每一端子槽23内设有一端子(图未示)，而端子设有一具弹性的接触部凸出至该放置区22。

该金属上盖30是设有一盖面31及两侧壁32，其前端两侧各设有一呈弯弧状的枢接部33且中间设有一抵止片34，该枢接部33枢接于底座的金属外座10前端的第二枢接部15，其后端设有二呈横向并向前凸出的凸片35，该盖面31中央设有一透空区36，当金属上盖30盖合于底座时，其盖面31可下压该晶片37的周缘且其侧壁32套合于塑胶内座20的两侧，另外，当金属上盖30在掀起呈纵向时，其抵止片34可抵于金属外座10的后端而不致掉落出。

该摇杆25设有相互呈垂直的第一杆26及第二杆27，该第二杆27枢接于底座

的金属外座10前端的第一枢接部14, 且其弯曲形成一凸杆28, 该第一杆26外端弯曲形成一手把29, 如图3所示, 当第一杆26往底座前端摇动至水平而为该定位片16定位时, 该凸杆28可压制该金属上盖30的凸片35而令该金属上盖30压下并定位该晶片37。

现有的金属上盖30为了节省材料, 于盖面31设有一透空区36, 而该金属外座10的底面11中央亦形成一透空区13借以使塑胶内座20上的端子槽露出; 请参阅图4, 该二金属外座10排列于一金属片38冲压制造时, 由于其中央的透空区13为封闭区域, 故二金属外座10无法交叉排列相互利用彼此的透空区13, 只能直接打掉形成废料, 如此在制造上甚为浪费材料; 请参阅图5, 该二金属上盖30排列于一金属片38冲压制造时, 同样由于其中央的透空区36为封闭区域, 故二金属上盖30无法交叉排列相互利用彼此的透空区36, 只能直接打掉形成废料, 如此在制造上甚为浪费材料。

【实用新型内容】

本实用新型的主要目的在于提供一种电连接器, 其在制造上可节省金属上盖或金属外座的用料, 达到降低制造成本。

为达上述目的, 本实用新型电连接器包括有: 一金属外座, 其设有一底面, 该底面中间设有一透空区, 其一端设有一第一枢接部; 一塑胶内座, 其是设于该金属外座上, 其上设有多个端子槽; 及一金属上盖, 其设有一顶面, 该顶面中间设有一透空区, 其一端设一枢接部, 该枢接部与该金属外座的第一枢接部枢接, 使金属上盖可与金属外座作枢转; 其特征在于, 该金属外座和金属上盖两者至少其中之一设有至少一断开构造, 使其透空区成一非封闭区而与外界相通。

借由以上构造, 该金属外座或金属上盖借由该断开构造使其透空区成一非封闭区, 如此在制造上可达到节省材料。

本实用新型的上述及其他目的、优点和特色由以下较佳实施例的详细说明中并参考图式当可更加明白, 其中:

【附图说明】

- 图1 是现有电连接器与晶片的立体分解图。
 图2 是现有电连接器的使用状态立体图。
 图3 是现有电连接器的使用状态立体图。
 图4 是现有电连接器的金属外座在制造上的用料示意图。
 图5 是现有电连接器的金属上盖在制造上的用料示意图。
 图6 是本实用新型第一实施例的立体分解图。
 图7 是本实用新型第一实施例的使用状态立体图。
 图8 是本实用新型第一实施例的金属外座在制造上的用料示意图。
 图9 是本实用新型第一实施例的金属上盖在制造上的用料示意图。
 图10是本实用新型第二实施例的立体组合图。
 图11是本实用新型第二实施例的金属外座与塑胶内座立体分解图。
 图12是本实用新型第二实施例的金属外座在制造上的用料示意图。
 图13是本实用新型第三实施例的金属外座立体组合图。
 图14是本实用新型第三实施例的金属外座的立体分解图。
 图15是本实用新型第四实施例的金属外座立体组合图。
 图16是本实用新型第四实施例的金属外座的立体分解图。
 图17是本实用新型第五实施例的金属上盖立体组合图。
 图18是本实用新型第五实施例的金属上盖的立体分解图。
 图19是本实用新型第六实施例的金属上盖立体组合图。
 图20是本实用新型第六实施例的金属上盖的立体分解图。

金属外座10	底面11	侧壁12	透空区13
一枢接部14	第二枢接部15	定位片16	
内座20	凸缘21	放置区22	端子槽23
摇杆25	第一杆26	第二杆27	凸杆28
手把29	金属上盖30	盖面31	侧壁32
枢接部33	抵止片34	凸片35	晶片37

金属外座 40	底面 41	侧面 42	透空区 43
第一枢接部 44	第二枢接部 45	缺口 46	半座 47
固定部 48	塑胶内座 50	端子槽 51	放置区 52
端子槽 53	卡槽 55	金属上盖 60	顶面 61
侧面 62	透空区 63	凸片 64	枢接部 65
缺口 66	侧部 67	前端部 68	
摇杆 70	第一杆 71	第二杆 72	凸杆 73
手把 74	晶片 37	金属片 38	连接片 80

【具体实施方式】

请参阅图6及图7，本实施例的电连接器是包括有：一金属外座40、一塑胶内座50、一金属上盖60、及一摇杆70，其中：

该金属外座 40 设有一底面 41 及向上的两侧面 42，该底面 41 的中央内形成一透空区 43，其前端两侧各设有一第一枢接部 44，而后端两侧各设有一第二枢接部 45 且中段设有一断开构造，该断开构造为一缺口 46，使该透空区 43 成一非封闭区而与外界相通。

该塑胶内座 50 是设于该金属外座 40 上，其上间隔排列设有多个端子槽 51，其上周缘设有向上的凸缘 51 而围成一放置一晶片的放置区 52，该放置区间隔排列设有多个端子槽 53，该多个端子槽 53 对应该透空区 43，该每一端子槽 53 内设有一端子(图未示)，而端子设有一具弹性的接触部凸出至该放置区 52。

该金属上盖 60 是设有一顶面 61 及向下的两侧面 62，该顶面 61 中间设有一透空区 63，其前端设有一凸片 64，其后端两侧各设有一呈弯弧状的枢接部 65 且中段设有一断开构造，该断开构造为一缺口 66，使该透空区 63 成一非封闭区而与外界相通。

该摇杆70设有相互呈垂直的第一杆71及第二杆72，该第二杆72枢接于金属外座40前端的第一枢接部44且中段弯曲形成一凸杆73，该第一杆71外端弯曲形成一手把74，当第一杆71往后摇动时，该凸杆73可压制该金属上盖60的凸片64

而使该金属上盖70压住该晶片37。

请参阅图 8，为该金属外座 40 在制造上的用料示意图，该二金属外座 40 排列于一金属片 38 冲压制造时，由于其中央的透空区 43 为非封闭区域，故二金属外座 40 借由该缺口 46 而可交叉排列相互利用彼此的透空区 43，如此相对于图 4 所示的现有金属外座用料较为节省材料。

请参阅图 9，为该金属上盖 60 在制造上的用料示意图，该二金属上盖 60 排列于一金属片 38 冲压制造时，由于其中央的透空区 63 为封闭区域，故二金属上盖 60 借由该缺口 66 而可交叉排列相互利用彼此的透空区 63，如此相对于图 9 所示的现有金属上盖用料较为节省材料。

请参阅图 10 及图 11，是为本实用新型的第二实施例，其大致与第一实施例相同，其中差异在于该塑胶内座 50 的底部四周各设有一卡槽 55，该金属外座 40 的前、后端各设有一缺口 46，使该金属外座 40 分开成二个半座 47，两半座 47 于前后端的底面 41 各设有一纵向的固定部 48 与该塑胶内座 50 的卡槽 55 固定。

请参阅图 12，为第二实施例的金属外座在制造上的用料示意图，由于金属外座分开成二个半座 47，如此可更为紧密的排列于金属片 38 冲压，更较第一实施例节省材料。

请参阅图 13 及图 14，是为本实用新型的第三实施例，其大致与第二实施例相同，其中差异在于该金属外座 40 前端更设有一连接片 80，该连接片 80 两端铆合固定于缺口 46 两边的半座 47，借以补强金属外座 40 的强度。

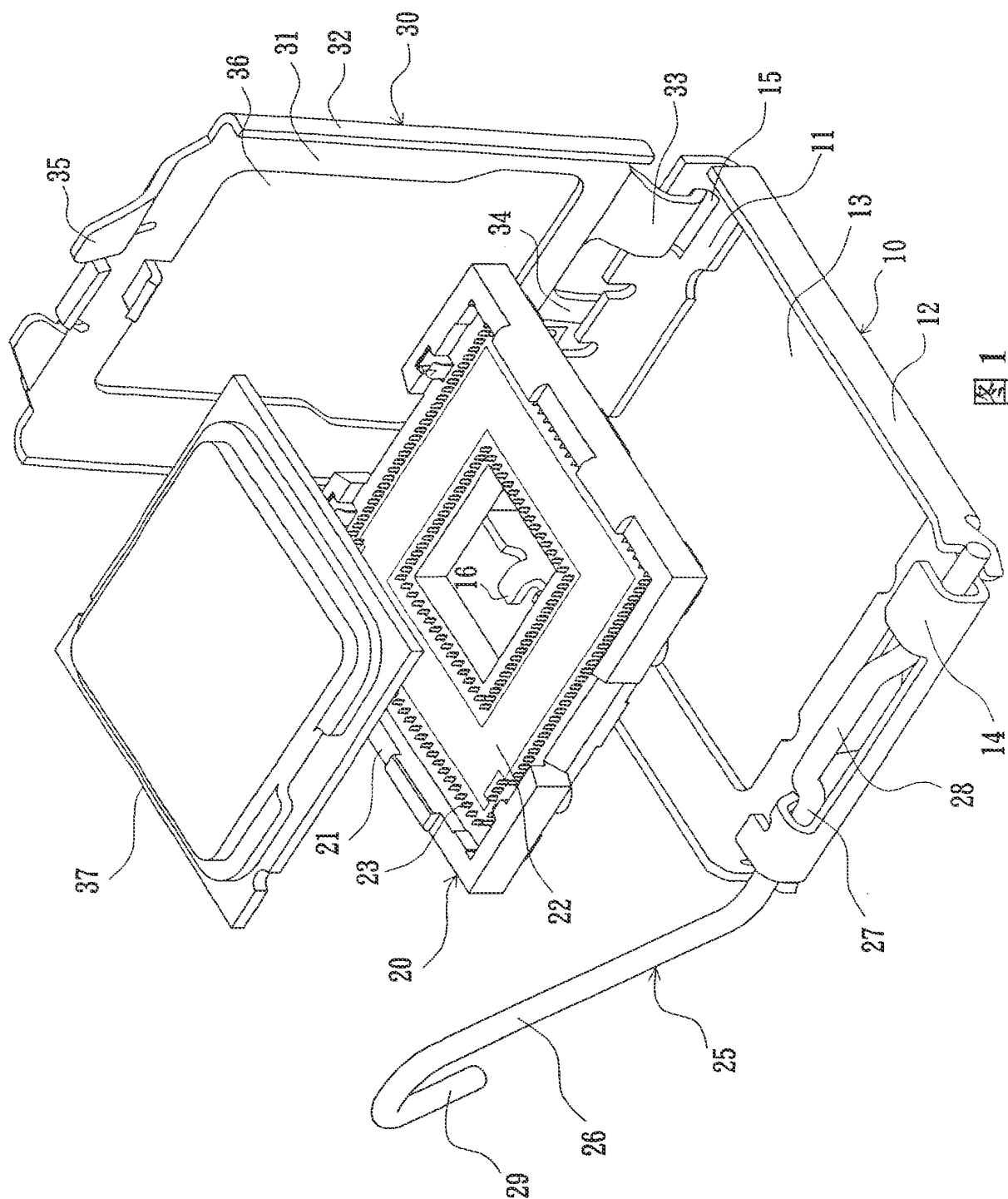
请参阅图 15 及图 16，是为本实用新型的第四实施例，其大致与第三实施例相同，其中差异在于该金属外座 40 前、后端皆设有一连接片 80，该连接片 80 两端铆合固定于缺口 46 两边的半座 47，借以补强金属外座 40 的强度。

请参阅图 17 及图 18，是为本实用新型的第五实施例，其大致与第一实施例相同，其中差异在于该金属上盖 60 的前端更设有一断开构造，使该金属上盖 60 分开成两侧部 67 及一前端部 68，该前端部 68 的两侧再与该两侧部 67 前端铆合。

请参阅图 19 及图 20，是为本实用新型的第六实施例，其大致与第五实施

例相同，其中差异在于该金属上盖 60 的后端更设有一连接片 80，该连接片 80 两端铆合固定于缺口 66 两边的两侧部 67，借以补强金属上盖 60 的强度。

在较佳实施例的详细说明中所提出的具体的实施例仅为了易于说明本实用新型的技术内容，而并非将本实用新型狭义地限制于该实施例，在不超出本实用新型的精神及申请专利范围的情况，可作种种变化实施。



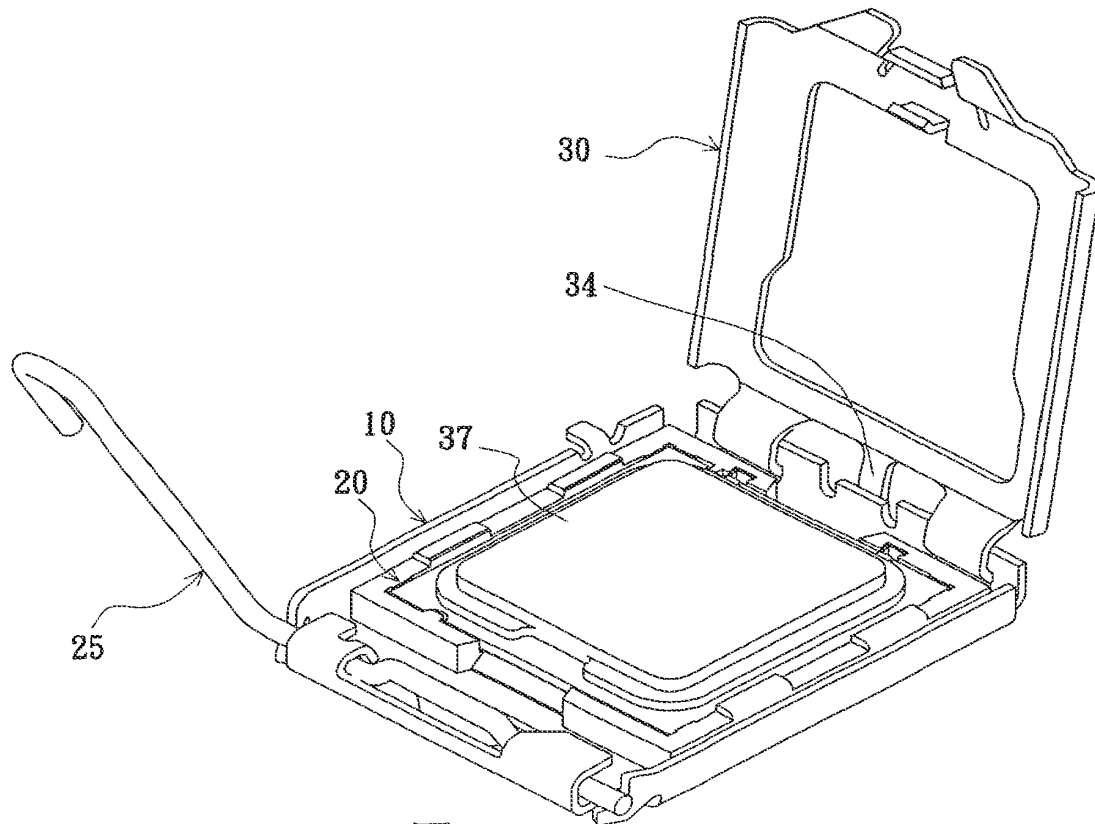


图 2

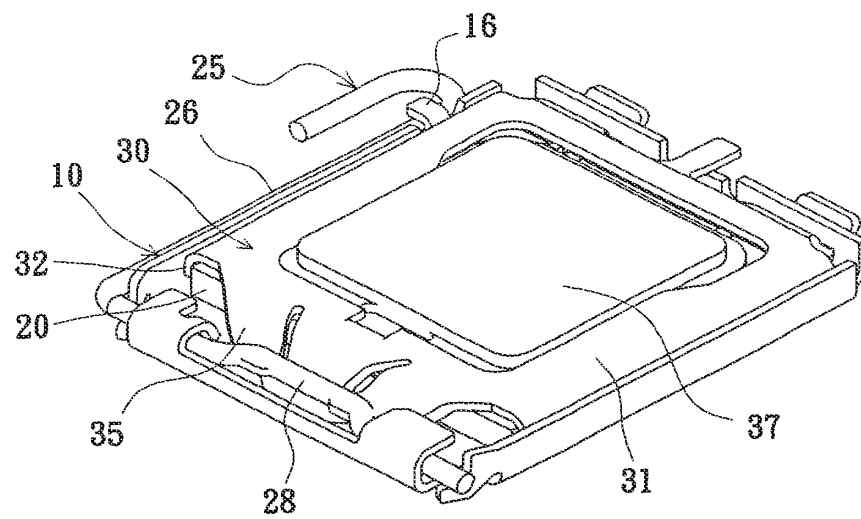


图 3

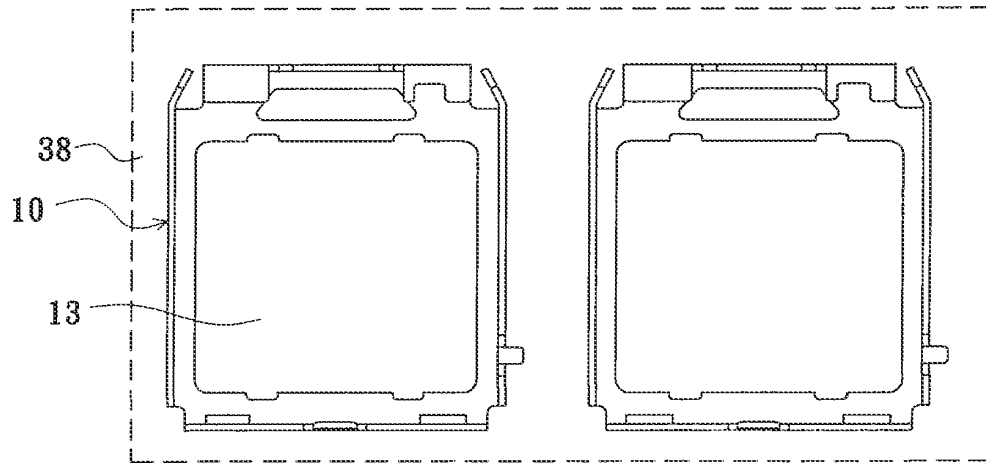


图 4

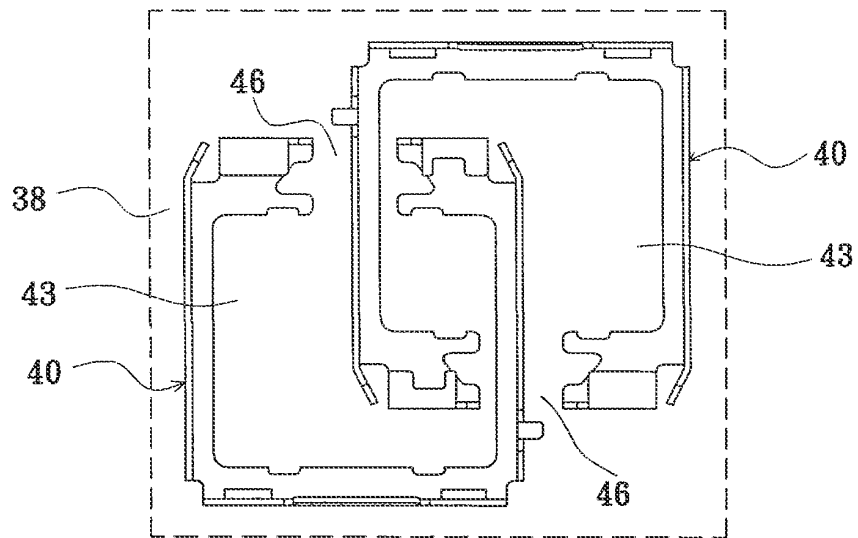


图 8

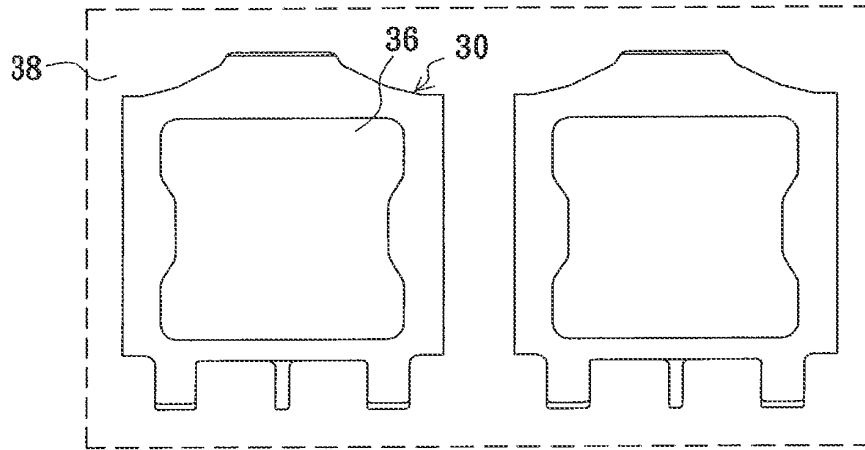


图 5

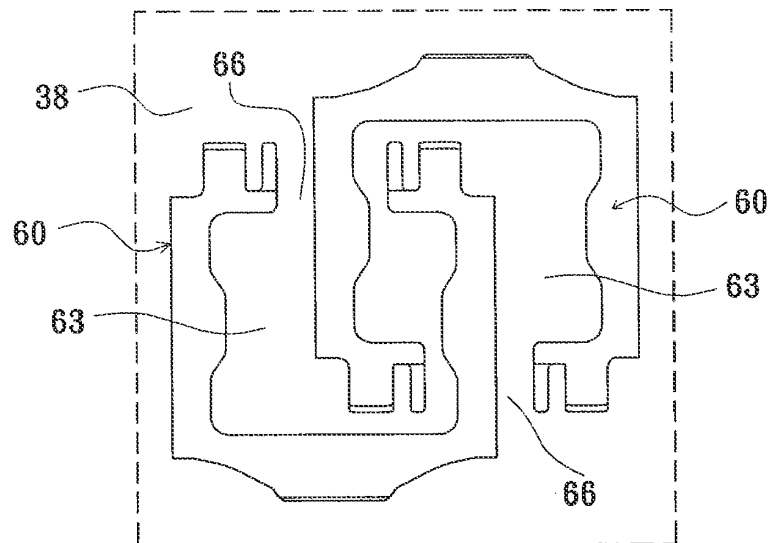


图 9

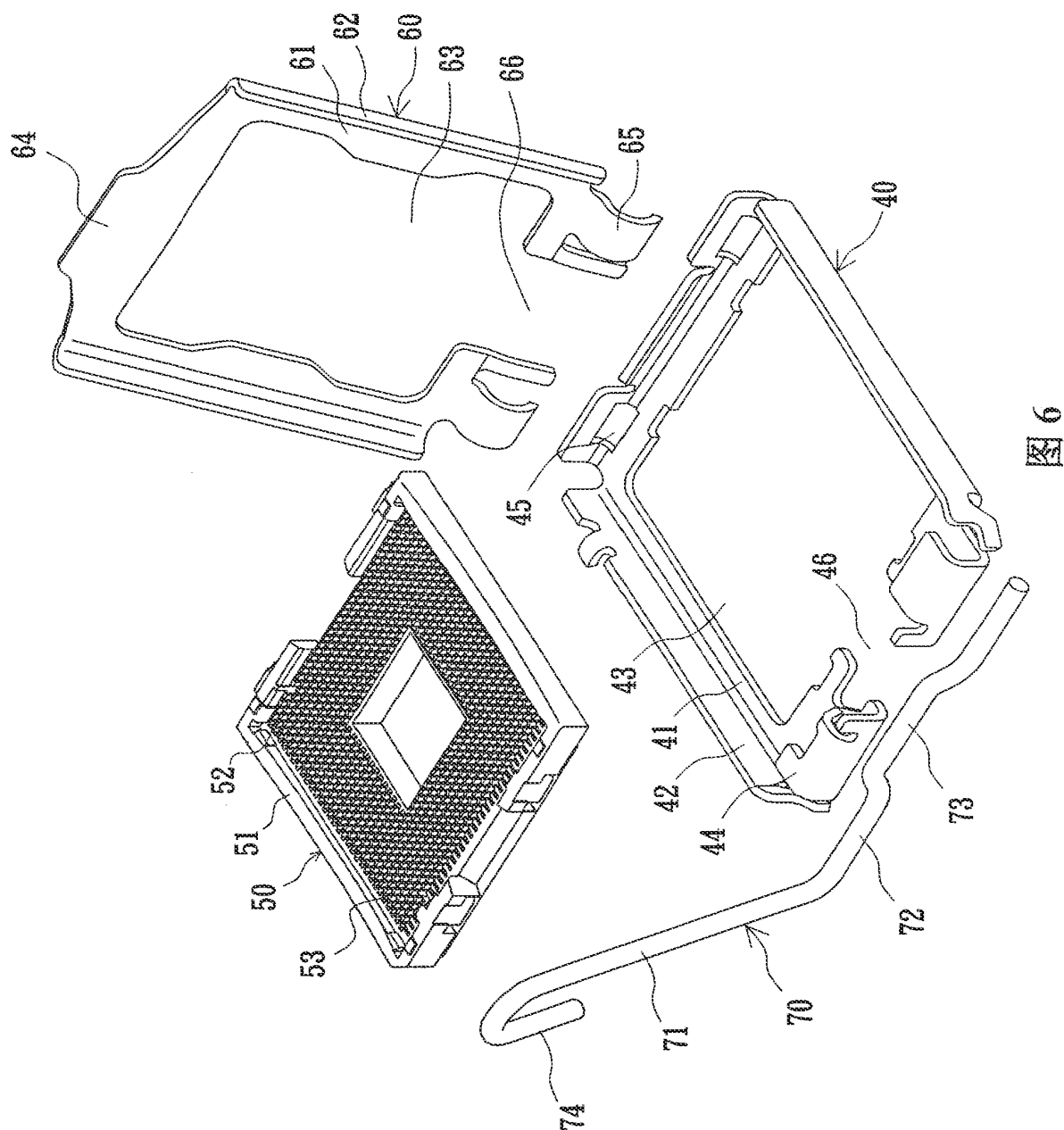


图 6

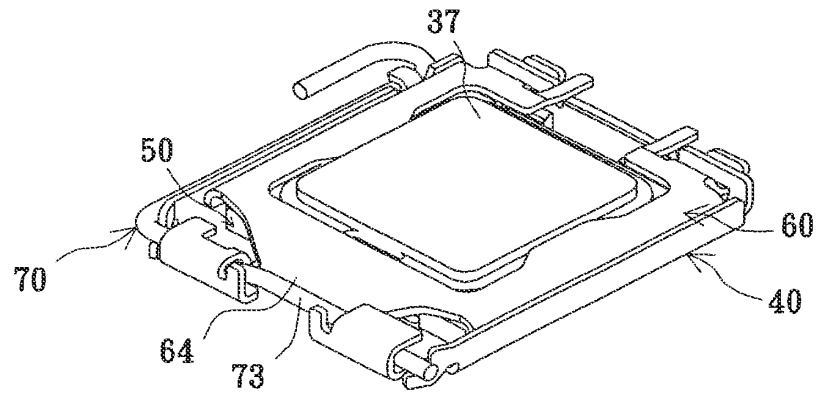


图 7

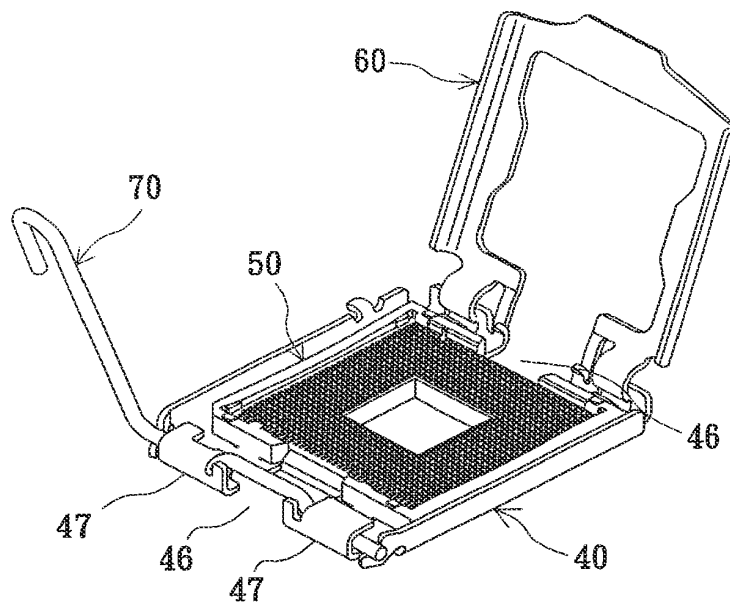


图 10

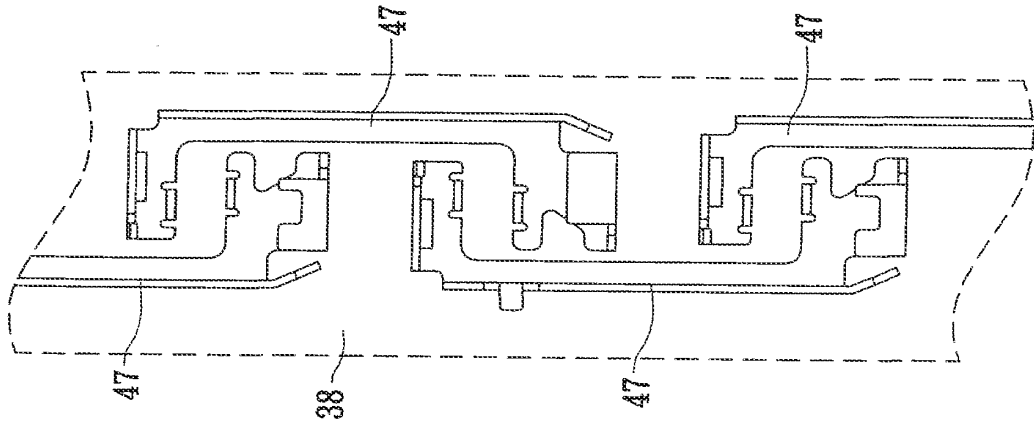


图 12

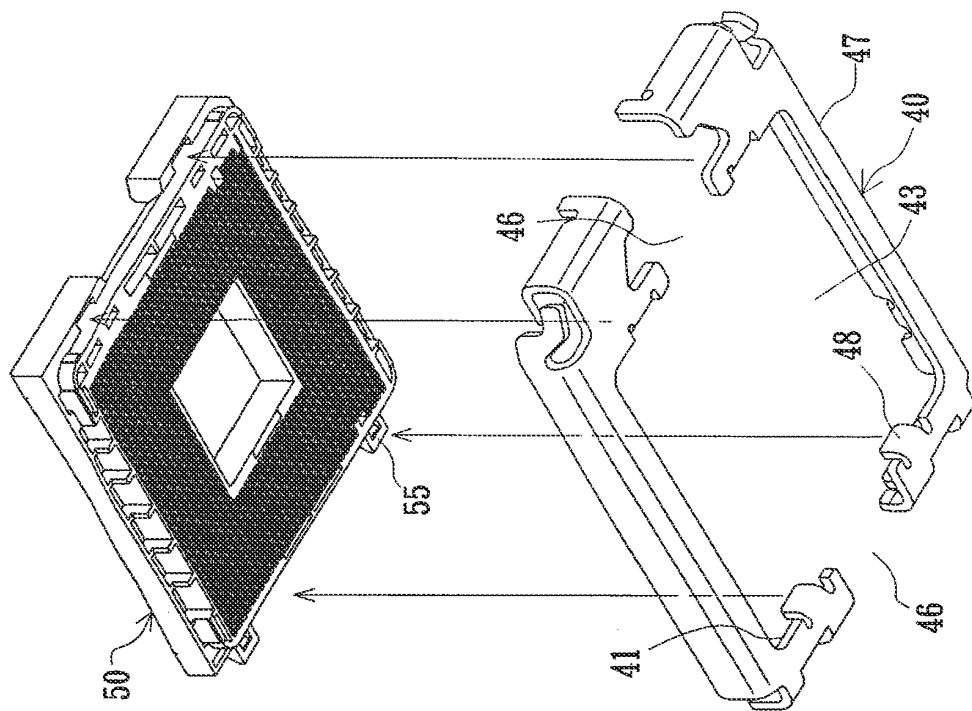


图 11

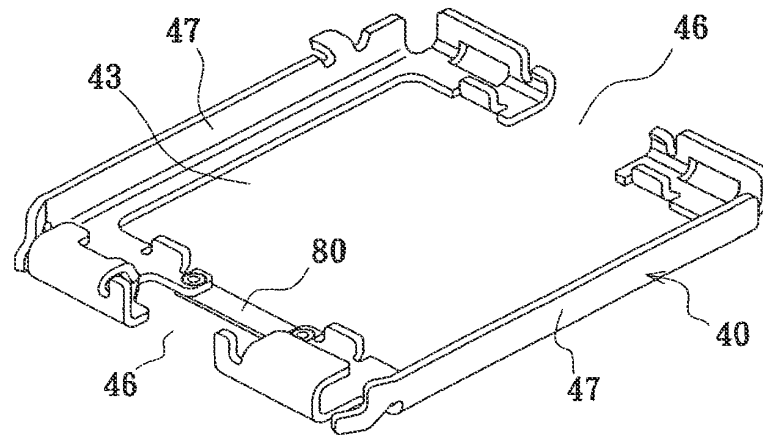


图 13

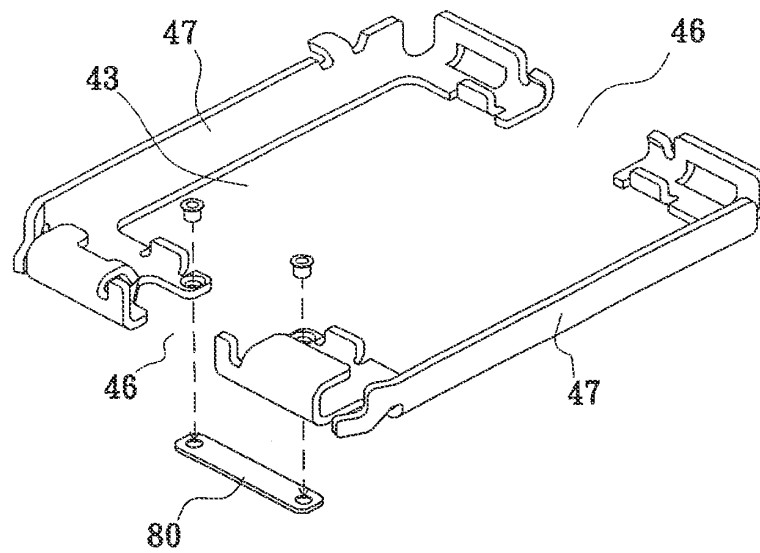


图 14

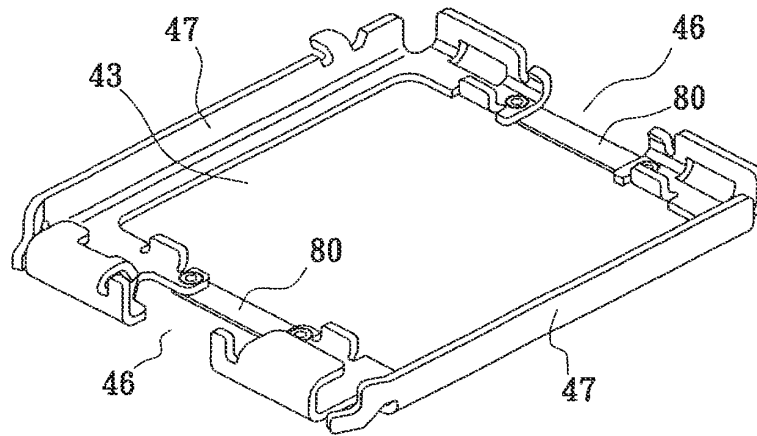


图 15

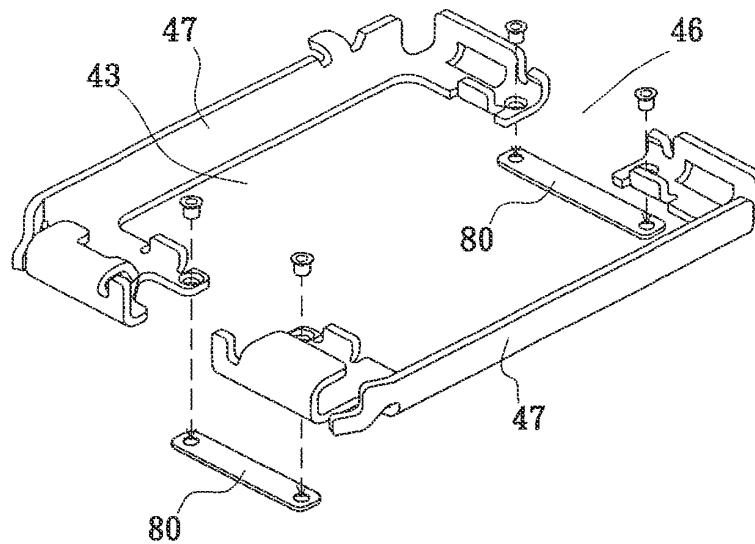


图 16

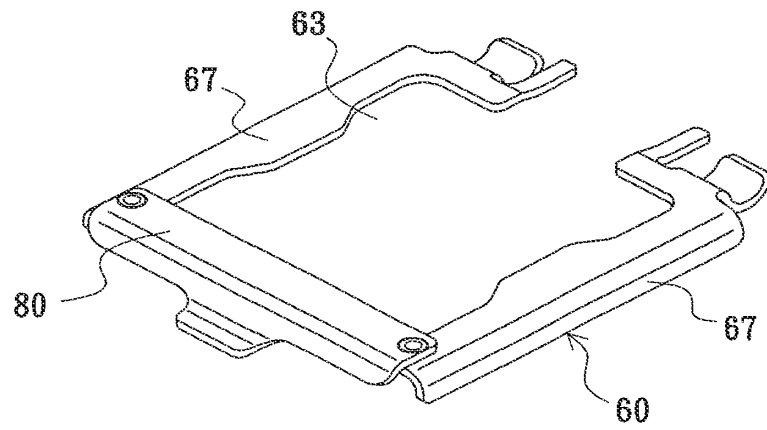


图 17

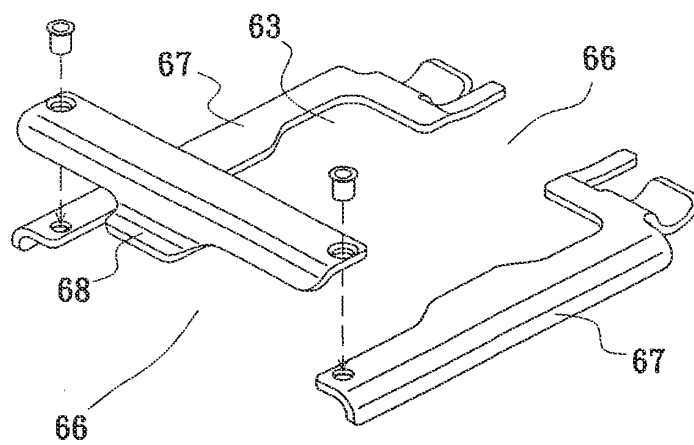


图 18

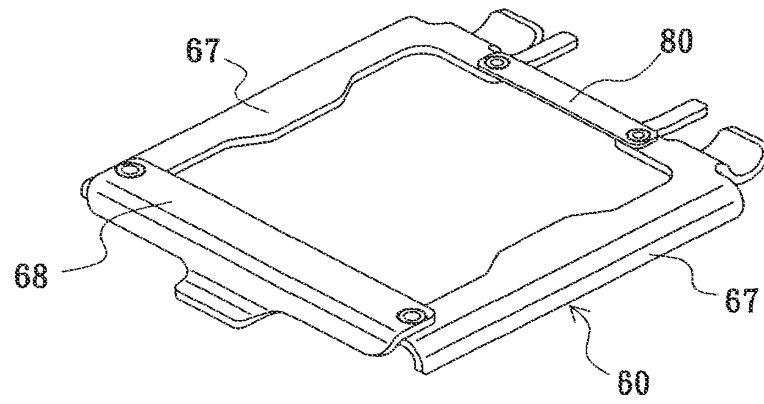


图 19

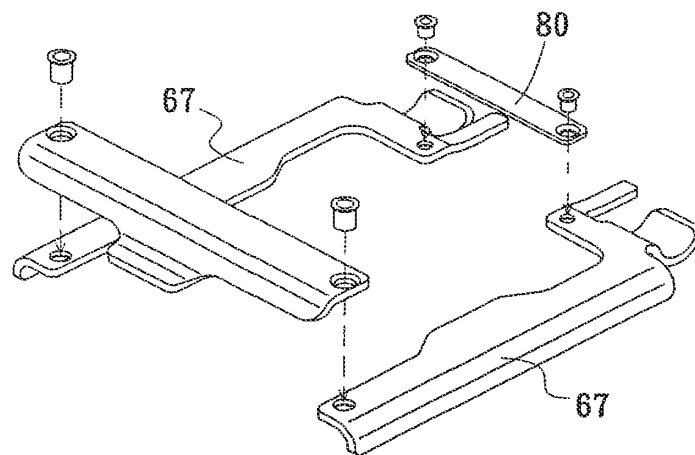


图 20



Espacenet

Bibliographic data: CN201369403 (Y) — 2009-12-23**Sharable signal line socket structure**

Inventor(s): ZHOUXIAN CAI [CN] ± (CAI ZHOUXIAN)
Applicant(s): ZHOUXIAN CAI [CN] ± (CAI ZHOUXIAN)
Classification: - **international:** *H01R12/55; H01R13/40; H01R31/02*
- **cooperative:**
Application number: CN20092001409U 20090106
Priority number(s): CN20092001409U 20090106

Abstract of CN201369403 (Y)

The utility model relates to a sharable signal line socket structure, which comprises a plastic seat body, a row of first terminals and a row of second terminals, wherein a sharable slot is arranged on the plastic seat body, the sharable slot can hold at least two connectors of different connection interfaces, an entry is arranged at the front end of the sharable slot and a tongue piece is arranged in the entry; the contract parts of the first terminals are arranged on one side of the tongue piece and electrically connected with one connector; and the contact parts of the second terminals are arranged on the side of the tongue piece same as the contact parts of the first terminals and electrically connected with the other connector. The first terminals and the second terminals are formed by a common metallic sheet, are connected with a tape and then integrally electroplated. The fixed parts of at least one row of terminals are provided with convex connecting parts which are connected with the tape. The first terminals and the second terminals are assembled on the plastic seat body and then the tape is taken down. The disconnection positions of the convex connecting parts and the tape are of new sections without electroplated layers. The convex connecting parts with new sections are in the same row and at the same height. A transition part is arranged between the contact part and the extension part of at least one second terminal, so as to enable the contact parts of the second terminals to be overlapped with the contact parts of the first terminals in a coordinate X.

[19] 中华人民共和国国家知识产权局



[12] 实用新型专利说明书

专利号 ZL 200920001409. X

[51] Int. Cl.

H01R 12/14 (2006.01)

H01R 12/30 (2006.01)

H01R 13/40 (2006.01)

H01R 31/02 (2006.01)

[45] 授权公告日 2009 年 12 月 23 日

[11] 授权公告号 CN 201369403Y

[22] 申请日 2009.1.6

[21] 申请号 200920001409. X

[73] 专利权人 蔡周贤

地址 中国台湾台北县

[72] 发明人 蔡周贤

[74] 专利代理机构 永新专利商标代理有限公司

代理人 李树明

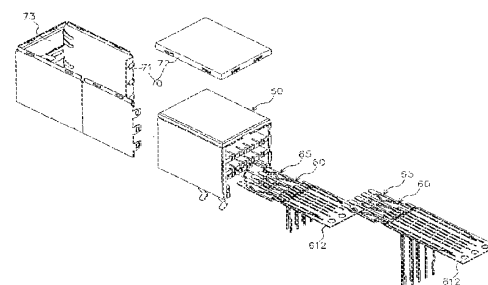
权利要求书 2 页 说明书 10 页 附图 13 页

[54] 实用新型名称

可共用的讯号线插座构造

[57] 摘要

一种可共用的讯号线插座构造，包括：塑胶座体设有共用槽，共用槽容纳至少二不同连接介面的接头，共用槽前端设有插入口且其内设有舌片；一排第一端子，其接触部位于舌片一面，并与一接头电连接；一排第二端子，其接触部与第一端子接触部位于舌片同一面，并与另一接头电连接；第一、二端子由同一金属片冲压形成并连接一料带，再整体电镀，第一、二端子其中至少一排端子的固定部设有连接凸部与料带连接，第一、二端子组装于塑胶座体并将料带取下，该连接凸部与料带断开处成无电镀层的新断面，具有新断面的连接凸部皆成同一排且同一高度，至少一第二端子的接触部与延伸部间设有一转折部，使第二端子的接触部和相邻第一端子的接触部在 X 坐标重叠。



1. 一种可共用的讯号线插座构造，其包括有：

一塑胶座体，其设有一共用槽，该共用槽可容纳至少二不同连接介面的接头，该共用槽前端设有一插入口且其内设有一舌片；

一排第一端子，其是间隔排列设于该塑胶座体上，其设有一接触部、一延伸部、一固定部及一接脚，该接触部位于该共用槽的舌片一面，该第一端子的接触部与一接头电连接；及

一排第二端子，其是间隔排列设于该塑胶座体上，其设有一接触部、一延伸部、一固定部及一接脚，该第二端子的接触部与该第一端子的接触部位于该共用槽的舌片同一面，该第二端子的接触部较该第一端子的接触部接近该插入口，该第二端子的接触部与另一接头电连接；

其特征在于：该一排第一端子和一排第二端子是由同一金属片冲压形成并连接一料带，再整体电镀，使一排第一端子和一排第二端子表面设有电镀层，该一排第一端子与一排第二端子其中至少一排端子的固定部在连接接脚的一端设有凸出的连接凸部与该料带连接，该一排第一端子和一排第二端子组装于该塑胶座体后再将相连的料带取下，该连接凸部与料带断开处成一无电镀层的新断面，该所有具有新断面的连接凸部皆成同一排且同一高度，且其中至少一第二端子的接触部与延伸部间设有一转折部，使该第二端子的接触部和相邻第一端子的接触部在 X 坐标形成重叠。

2. 如权利要求 1 所述的可共用的讯号线插座构造，其特征在于：还设有一金属外壳包覆该塑胶座体，该金属外壳的一面设有开口借以令该塑胶座体的共用槽露出。

3. 如权利要求 1 所述的可共用的讯号线插座构造，其特征在于：该第二端子的接触部平贴于舌片上为不可弹动，该第一端子的接触部凸出该舌片为可上下弹动。

4. 如权利要求 1 所述的可共用的讯号线插座构造，其特征在于：该共用槽设有至少二不同宽度或高度的第一插槽和第二插槽，可容纳至少二不同宽度

或高度的接头，第一插槽和第二插槽具有共用空间。

5. 如权利要求 4 所述的可共用的讯号线插座构造，其特征在于：该第二插槽的高度较第一插槽为小且宽度较第一插槽为大，该第一插槽所可容纳一 USB 接头，该第二插槽所容纳的接头为一 eSATA 接头，且还设有一排第三端子，其设有一接触部位于该舌片的另一面相对于第一、二端子的接触部，该第三端子的接触部与 eSATA 接头电连接，该第一、二端子的接触部与 USB 接头电连接。
6. 如权利要求 1 所述的可共用的讯号线插座构造，其特征在于：该一排第一端子和一排第二端子均设有具有新断面的连接凸部，该所有具有新断面的连接凸部皆成同一排且同一高度。
7. 如权利要求 1 所述的可共用的讯号线插座构造，其特征在于：该一排第一端子和一排第二端子的固定部在端子依序排列方向的 X 坐标完全错开。
8. 如权利要求 1 所述的可共用的讯号线插座构造，其特征在于：该共用槽是容纳二不同连接介面的 USB 接头。

可共用的讯号线插座构造

【技术领域】

本实用新型是关于一种电连接器，特别是指一种可共用的讯号线插座构造。

【背景技术】

现今电脑设最普及的讯号传输规格莫过于通用串行总线(Universal Serial Bus, 简称USB)，以此规格制作的连接器插座及传输线可使外接于电脑的周边设备，如滑鼠、键盘等，即时为电脑所测得并立即使用。

为了满足高流量资料传输的需求，目前有另一种随插即用的传输规格，序列先进附加技术(External Serial ATA, 简称eSATA)，此规格传输值较USB为大。

上述USB和eSATA的介面并不相容，惟两种所属的插座颇为类似然而无法共用。

请参阅图1，是为一种现有的讯号线连接器，其是包括有一塑胶座体10、四个第一端子20、七个第二端子25及一金属外壳30，其中：

该塑胶座体10是设有一USB接头插槽11及一eSATA接头插槽15，该USB接头插槽11内设有一舌片12，该eSATA接头插槽15内设有一舌片16。

该第一端子20固定于该塑胶座体10，其设有一可上下弹动的接触部21及一接脚22，该接触部21位于该USB接头插槽11内并凸出该舌片12下方，该接脚22伸出塑胶座体10下方借以连接至一电路板35。

该第二端子25固定于该塑胶座体10，其设有一不可弹动的接触部26及一接脚27，该接触部26位于该eSATA接头插槽15内并凸出该舌片16上方，该接脚22伸出塑胶座体10下方借以连接至一电路板35。

该金属外壳体30是包覆在该塑胶座体的四周面及顶面，其一面设有开孔

31、32，借以令USB接头插槽11及eSATA接头插槽15露出。

请参阅图2，是为一USB接头，其为USB2.0规格者，该USB-2.0接头40成方形，其设有一塑胶体41、一外铁壳42、及四个端子接点43，外铁壳42包覆塑胶体41后其内形成有空间44，斜线区域为示意塑胶体41，该四个端子接点43不具弹性且露出该空间44，请配合参阅图1，该USB-2.0接头40的空间44对应USB接头插槽11的舌片12插入作电连接，此时其端子接点43即与第一端子20的接触部21弹性接触。

请参阅图3，是为一eSATA接头45，其大致成方形而两侧略为凸出，其设有一塑胶体46、一外铁壳47、及七个端子接点48，该塑胶体46中间形成有空间49，斜线区域为示意塑胶体46，该七个端子接点48具有上下弹动的弹性且露出该空间49，请配合参阅图1，该eSATA接头45的空间49对应eSATA接头插槽15的舌片16插入作电连接，此时其端子接点48即与第二端子25的接触部26弹性接触。

上述现有的讯号线连接器上所设有USB接头插槽11仅能限定插入USB接头，而eSATA接头插槽15则仅能限定插入eSATA接头，即任一插槽没有共用功能，然而由于目前电脑的功能需求日益增强，依使用者不同需求，电脑上可能只需连接上4条USB接头的讯号线而不需连接eSATA接头的讯号线，亦有可能不需连接USB接头的讯号线而需连接4条eSATA接头的讯号线，如此电脑为配合使用者的不同需求，则必需分别各设置有4个USB接头插槽及4个eSATA接头插槽，如此相当占用空间且增加成本。

为了使用上的方便性，目前已有人设计USB接头的讯号线和eSATA接头的讯号线的共用插座，然而由于USB接头的接点和eSATA接头的接点在端子依序排列方向的X坐标形成部份重叠，故现有设计的共用插座有以下二种：

1. 四个第一端子(连接USB接头的接点)和七个第二端子(连接eSATA接头的接点)分别设置于舌片的两面，然而由于舌片的厚度很薄，如此使得第一端子的弹动空间甚小。

2. 四个第一端子(连接USB接头的接点)和七个第二端子(连接eSATA接头的接点)设置于舌片的同面，该四个第一端子必需找七个第二端子的间隙设置，

故当连接USB接头时，USB接头的接点与第一端子无法对正连接，如此电连接的包容量甚小。

再者，为了缩短传输时间，目前的USB接头已发展至USB3.0，USB3.0接头的连接介面较USB2.0接头多出一排端子，故传输速度更快，如此若要整合USB3.0接头和eSATA接头共用，则该共用插座需设计有三排端子，如此增加制造上的困难度。

【实用新型内容】

本实用新型的主要目的在于提供一种可共用的讯号线插座构造，二排端子由同一铜片冲压而成的，冲压完成各端子依序排列连接于一料带上，可同时作电镀，一次组装于塑胶座体，达到省料且省工，降低制造成本。

本实用新型的次要目的在于提供一种可共用的讯号线插座构造，二排端子由同一铜片冲压而成，二排端子的连接凸部成同一排可更易于设置于共用槽的舌片上。

本实用新型的次要目的在于提供一种可共用的讯号线插座构造，其可达到端子的可弹动接触部具有足够弹动空间。

为达上述目的，本实用新型可共用的讯号线插座构造包括有：一塑胶座体，其设有一共用槽，该共用槽可容纳至少二不同连接介面的接头，该共用槽前端设有一插入口且其内设有一舌片； 一排第一端子，其是间隔排列设于该塑胶座体上，其设有一接触部、一延伸部、一固定部及一接脚，该接触部位于该共用槽的舌片一面，该第一端子的接触部与一接头电连接；及一排第二端子，其是间隔排列设于该塑胶座体上，其设有一接触部、一延伸部、一固定部及一接脚，该第二端子的接触部与该第一端子的接触部位于该共用槽的舌片同一面，该第二端子的接触部较该第一端子的接触部接近该插入口，该第二端子的接触部与另一接头电连接；其特征在于，该一排第一端子和一排第二端子是由同一金属片冲压形成并连接一料带，再整体电镀，使一排第一端子和一排第二端子表面设有电镀层，该一排第一端子与一排第二端子其中至少一排端子的固定部在连接接脚的一端设有凸出的连接凸部与该料带连接，该一排第一端子和

一排第二端子组装于该塑胶座体后再将相连的料带取下,该连接凸部与料带断开处成一无电镀层的新断面,该所有具有新断面的连接凸部皆成同一排且同一高度,且其中至少一第二端子的接触部与延伸部间设有一转折部,使该第二端子的接触部和相邻第一端子的接触部在X坐标形成重叠。

结合上述,本实用新型的可共用的讯号线插座构造,由于二排端子由同一铜片冲压而成的,冲压完成各端子依序排列连接于一料带上,可同时作电镀,一次组装于塑胶座体,因此具有省料且省工,降低制造成本的优点。

本实用新型的上述及其他目的、优点和特色由以下较佳实施例的详细说明中并参考图式当可更加明白。

【附图说明】

图1 是现有的讯号线连接器的前视图。

图2 是现有USB接头前视示意图。

图3 是现有eSATA接头前视示意图。

图4 是本实用新型第一实施例的立体分解图。

图5 是本实用新型第一实施例的前视组合图。

图6 是本实用新型第一实施例的侧视组合图。

图7 是本实用新型第一实施例的端子依序排列立体图。

图8 是本实用新型第一实施例的端子依序排列的上视图。

图9 是本实用新型第一实施例插入USB2.0接头的使用状态侧视图。

图10是本实用新型第一实施例插入USB3.0接头的使用状态前视图。

图11是本实用新型第二实施例的立体分解图。

图12是本实用新型第三实施例的立体组合图。

图13是本实用新型第三实施例的前视组合图。

图14是本实用新型第三实施例的侧视组合图。

图15是本实用新型第三实施例的使用状态侧视图。

图16是本实用新型第三实施例的端子依序排列立体图。

图17是本实用新型第三实施例的端子依序排列的上视图。

图18是本实用新型第四实施例的侧视组合图。

图19是本实用新型第五实施例的前视组合图。

图20是本实用新型第五实施例的侧视组合图。

图21是本实用新型第六实施例的前视组合图。

图22是本实用新型第七实施例的前视组合图。

图23是本实用新型第八实施例的前视组合图。

图24是本实用新型第九实施例的前视组合图。

USB接头40	端子接点43	eSATA接头45	端子接点48	
塑胶座体 50	共用槽 51	第一插槽 52	第二插槽 53	
舌片 54	第一端子 60	接触部 61	延伸部 62	
固定部 63	接脚 64	第二端子 65	接触部 66	延伸部 67
转折部 68	弯折部 69	固定部 610		
接脚 611	料带 612	连接凸部 613	新断面 614	
连接凸部 616	新断面 617			
金属外壳70	主体71	上盖72	开口73	
第三端子75	接触部76	延伸部77	接脚79	
USB3.0接头90	端子接点92	端子接点91		

【具体实施方式】

请参阅图4、图5、及图6，是为本实用新型第一实施例，是为一双层的共用槽设计者，其包括一塑胶座体50、二排第一端子60、二排第二端子65及一金属外壳70，其中：

该塑胶座体50堆叠设有二共用槽51，其前端为该共用槽51的插入口，该共用槽内设有一舌片54，该共用槽51所插入的电子元件为一USB接头，USB接头有分为USB2.0接头及USB3.0接头二种不同连接介面。

请配合参阅图7及图8，该一排第一端子60和一排第二端子65是同时由同一铜片冲压而成的，冲压后皆是固定部后端连接于料带612，再整体电镀，