

Description

The present invention relates to an electrical plug and socket connector for use in connecting a flat plate like IC-package to some other circuitry and more particularly to a contact arrangement composed of a plug pin and receptacle thereof.

A connector and a contact, i.e. plug pin and receptacle, arrangement suitable for use in connection with an IC-package has a very small size. A conventional contact arrangement depicted in Figures 1 to 4 of the accompanying drawings and described hereinafter suffers from certain disadvantages and is prone to suffer wear and deformation which adversely affects its durability. US-A-3186606 discloses an electrical connector composed of a receptacle and a plug pin for fast assemblage and disconnection. GB-1553159 relates to an electrical terminal pin holding block, as commonly used in motor vehicles.

EP-A-0224964 also describes an electrical connector composed of a receptacle and a plug pin.

A general object of the present invention is to provide an improved contact arrangement.

According to the invention, and as is known from US-A-3186606, there is provided a contact arrangement for an electrical connector composed of a plug pin and a receptacle, the plug pin being insertable into the receptacle. The receptacle is formed from metal sheet shaped to define first and second spaced apart frames at least the first frame defining an opening for receiving the plug pin. The first frame comprises a base member, two side members extending perpendicularly from each side of the base member and a top opposite the base member formed from two separate top members extending toward each other from each respective side member. The receptacle further comprises a base contact region extending between the two frames and a pair of resilient contact rails of rectangular cross-section extending respectively from each of the top members of the first frame towards the second frame, opposite the base contact region. In contrast to US-A-3186606, but as is known from EP-A-0224964, the contact rails are continuously curved inwardly toward the base region in a direction away from the top members of said first frame. In accordance with the invention, the top members of said first frame and the rails are touching or closely adjacent one another when the plug pin is separated from the receptacle so that the first frame is substantially closed but when the pin is inserted into the receptacle, the pin engages the base contact region and the contact rails to cause the side members of the first frame to swing outward thus separating the first and second contact rails. In accordance with the invention, the plug pin is provided with an arcuate surface or surfaces which are contacted by the contact rails when the plug pin is received by the receptacle. The plug pin may be substantially rectangular in cross

section.

The second frame may also be rectangular and of the same configuration as the first frame. This causes the receptacle to be inherently rigid and strong and well able to withstand deformation forces. The base wall region may be a flat section wall or a curved resilient support confronting the contact rails. The contact rails may adjoin both frames or at least the first frame to form effectively a slotted side of the receptacle opposite the base wall region.

The curved contacts and the base region provide a constriction for the plug pin. The contact rails may interconnect the frames but alternatively, the contact rails may be cantilevered.

The rectangular reception opening is best made slightly larger than the plug pin while the latter is provided with a tapered free-end portion. The resilient contacts can then guide the plug pin into a correct orientation with the arcuate outer face or faces in engagement with the contacts. As the plug pin is inserted the contacts tend to be displaced laterally and outwardly from the plug pin over the curved side edges or corners of the latter.

The invention also extends to an integrated circuit package and to a plug and socket arrangement employing a contact arrangement as aforesaid.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention may be understood more readily, and various other features of the invention may become apparent, from consideration of the following description in conjunction with the accompanying drawings, wherein:-

Fig. 1 is a perspective view representing the outer appearance of an IC package equipped with a connector socket;

Fig. 2 is a perspective view of a known form of contact arrangement composed of a plug pin and receptacle of the connector for the package;

Fig. 3 is a section side view of the connector of the package;

Fig. 4 is a sectional view of the receptacle of the contact arrangement taken along line III-III of Fig. 2 and showing the plug pin being inserted therein;

Fig. 5 is a perspective view of a contact arrangement constructed in accordance with the invention with the plug pin removed from the receptacle;

Fig. 6 is a cross-sectional view of the arrangement taken along line VI-VI in Fig. 5;

Fig. 7 is a cross-sectional view, similar to Fig. 6, used to explain design features of the invention;

Fig. 8 is a sectional view taken along line VIII-VIII in Fig. 5;

Fig. 9 is a perspective view of another contact arrangement constructed in accordance with this invention; and

Fig. 10 is a cross-sectional view of the receptacle taken along line X-X in Fig. 9.

Fig. 1 shows a typical flat plate-like IC package 70 for receiving semi-conductor Integrated circuits, such as a memory and CPU. A connector socket 72 is mounted within the package 70. The socket 72 has a large number of holes 73 in a grid-like array with a shaped metal receptacle 74 located within each corresponding hole. The holes and receptacles are closely spaced such that, for example, 10 holes are disposed across 1cm of the socket end face. As can be appreciated the receptacles and the terminals thereof are very small in size.

Fig. 2 shows one of the receptacles 74 with an associated plug pin 78 detached therefrom. The receptacle 74 is composed of a cylindrical contact region 75 and a connection terminal 76 extending from one end of the contact region 75. Connection, for example with a semi-conductor device of the IC package 70 is established with an end portion 76a of the terminal 76. The associated plug pin 78 is a solid bar likewise cylindrical for reception in the contact region 75. The plug pin 78 has a tapered forward end portion 78a for ease of insertion and guidance vis a vis the contact region 75. The plug pins 78 are mounted onto a body of a connector plug 79 as shown in Fig. 3 which fits over the socket 72 on the package 70. The plug pins 78 have rear end regions bent at 90° to their front end portions 78a to provide terminals 78b connectible for example, to a circuit of a printed circuit board. In this way, plug-and-socket 72, 79 establishes connection between semi-conductor devices of the IC package and an external circuit e.g. the printed circuit board.

As shown in Fig. 4, the diameter ℓ of the cylindrical contact region 75 of each receptacle 74 is made somewhat smaller than the diameter d of the corresponding plug pin 78 so that good electrical contact is made when the plug pin 78 is inserted into the receptacle 74. Repeated insertion and withdrawal of the plug pins 78 into and out of the receptacles 74 subjects the plug pins 78 to wear and the cylindrical contact regions 75 to external expansion force, markedly reducing the effectiveness of the contacts of the connector.

DESCRIPTION OF PREFERRED EMBODIMENTS

A contact arrangement representing one embodiment of this invention is depicted in Figs. 5 and 6. As in Fig. 2, Fig. 5 shows a plug pin 30 separated from an associated receptacle 10 and as described above the receptacle 10 is disposed in one of the holes of the socket 72 on for example, an IC package and the plug pin 30 is mounted to a plug body and connected with a printed circuit board.

The receptacle 10 is formed by bending a metal sheet into a substantially rectangular parallelepiped configuration. A square insertion opening 11 with cor-

ners 12a-12d then provided by a first front end frame 12 spaced apart from a similar second rear end frame 13. The receptacle 10 has a longitudinal resilient curved support base contact section 16 which is integral with base wall portions 14, 15 of the first and second end frames 12, 13. Further longitudinal resilient rails 17, 18 of curved configuration are disposed opposite the base contact section 16. These rails 17, 18 form contacts and are spaced apart by a slot. The rails 17, 18 interconnect the upper portions of the first and second end frames 12, 13. Upstanding side wall portions 19, 20 join the base wall portions 14, 15 and the upper portions of the end frames 12, 13. A terminal 21 is formed integrally with the base wall portion 15 of the second end frame 13 and extends remote from the base contact section 16.

The plug pin 30 is designed to engage in the opening 11 and to become supported by the base contact section 16 and resiliently gripped between the sides of the receptacle i.e. by the wall region 16 and the contact rails 17, 18. As shown in Fig. 8, the opening 11 of the first end frame 12 of the receptacle 10 has a dimension L which is somewhat greater than the corresponding dimension D of the plug pin 30 so that the insertion of the plug pin 30 into the first end frame 12 will not cause deformation. Even if the plug pin 30 is inserted while mis-aligned with respect to the opening 11 the receptacle 10 dimension differential will ensure the rails 17, 18 and support wall 16 guide the pin 30 in place.

The rails 17 and 18 tend to displace or expand, as illustrated in figures 6 and 7, in the vertical direction outwardly of the plug pin 30 as well as in the lateral direction, and are hence swung aside in the direction of arrows a-a in Figs. 6 and 7, when the plug pin 30 is inserted into the receptacle 10. Although the plug pin 30 may be of substantially true rectangular form such a plug pin will tend to wear as the distinct corner side edges 41 and 42 contact the rails 17 and 18 as shown in Fig. 7. Hence, as can be appreciated from Fig. 6, it is desirable to round off at least the side corners of the plug pin 30 which are in resilient contact with the rails 17 and 18 to provide arcuate side edges 31 and 32. The curvature of the arcuate side edges 31 and 32 can be determined in accordance with the configuration of the receptacle 10, but is best selected so that better electrical connection will be obtained when the rails 17, 18 exhibit the swinging movement in the direction of arrows a-a in Fig. 6. The upper face 33 of the plug pin 30 near the rails 17, 18 may be rounded not only at side edges 31 and 32 but over its whole width. Better durability then results despite repeated insertion and withdrawal of the plug pin 30 into and out of the reception 10.

Since, the receptacle 10 is formed by bending a metal sheet into a substantially rectangular configuration, the mechanical strength of the first end frame 12 is increased by the presence of the corners 12a,

12b, 12c and 12d as is the second end frame 13 increased by its corners. The receptacle 10 thus inherently provides a high resistance to deformation. The rails 17, 18 and the base contact section 16 provide a good support structure with an adequate flexibility without the need for other intermediate parts and allow the plug pin 30 to be supported in a stable fashion with a good firm contact.

Fig. 9 depicts a modified contact arrangement representing another embodiment of the invention. In this arrangement, a receptacle 50 again formed from an integral metal sheet into the rectangular front and rear frames receives a plug pin 60. One side of the receptacle is defined by a pair of parallel longitudinal upper contact rails 51 and 52 which are cantilevered springs integral with the front frame 53 only. The base wall portions of the front and rear frames are joined by a flat integral base wall region and the side wall portions of the frames adjoin opposed elongate side walls of the receptacle 50. The curved base contact section 16 of Fig. 5 is thus omitted in this construction and the plug pin 60 contacts the flat base wall region and the cantilevered contact rails 51, 52 as shown in Fig. 10. The plug pin 60 again has arcuate side edges 61, 62 or an arcuate upper face which engage the contact rails 51, 52 of the receptacle 50 with proper contact and the side edges of the plug pin 60 are precluded from premature wear.

A highly durable mating contact can be achieved by treating the appropriate surfaces of the plug pins 30, 60 and receptacles 10, 50 as in a multi-layered fashion including, for example, a palladium alloy plating process or a harder noble-metal (for example, gold) plating process with heat-treatment.

Claims

1. A contact arrangement for an electrical connector composed of a plug pin (30, 60) and a receptacle (10, 50), the plug pin (30, 60) being insertable into the receptacle (10, 50) and the receptacle (10, 50) being formed from metal sheet shaped to define first and second spaced apart frames (12, 13), at least the first frame defining an opening for receiving the plug pin (30, 60) and including a base member (14, 53), two side members (19, 20) extending perpendicularly from each side of the base member and a top opposite the base member formed from two separate top members extending toward each other from each respective side member; the receptacle further comprising

a base contact region (16, 53) extending between the frames (12, 13) and a pair of resilient contact rails (17, 18, 51, 52) of rectangular cross-section extending respectively from each of the top members of the first frame towards the sec-

ond frame opposite the base contact region; wherein the contact rails (17, 18, 51, 52) are continuously curved inwardly toward the base contact region (16, 53) in a direction away from the top members of said first frame; wherein the top members of said members of said first frame and the contact rails (17, 18, 51) are touching or closely adjacent one another when the plug pin (30, 60) is separated from the receptacle so that the first frame is substantially closed but when the pin (30, 60) is inserted into the receptacle, the pin (30, 60) engages the base contact region (16, 53) and the contact rails (17, 18, 51, 52) to cause the side members (19, 20) of the first frame to swing outward thus separating the first and second contact rails (17, 18, 51, 52); and wherein the plug pin (30, 60) has an arcuate surface or surfaces (31, 32, 61, 62) the or each of which is contacted by the contact rails (17, 18, 51, 52) when the plug pin is received by the receptacle.

2. A contact arrangement according to Claim 1, wherein said base contact region (16) is resilient and is curved inwardly toward the first and second contact rails, (17, 18).
3. A contact arrangement according to Claim 1 or 2, wherein the second frame (13) is also composed of a base member (16) two side members (19, 20) extending perpendicularly from each side of the base member and a top opposite the base member formed from two separate top members extending towards each other from each respective side member and both ends of both the first and second contact rail (17, 18) are in contact with the respective upper wall portions of the first and second frames (12, 13).
4. A contact arrangement according to Claim 1 or 2, wherein one end of each of the first and second contact rails is free and the first and second contact rails thereby act like cantilever springs.
5. A contact arrangement according to any one of Claims 1 to 4, wherein a terminal (21) extends outwardly from the second frame (13) remote from the base contact region (16).
6. A contact arrangement according to any one of Claims 1 to 5, wherein the plug pin (30, 60) is an electrically conductive solid component.
7. A contact arrangement according to any one of Claims 1 to 6, wherein the plug pin (30, 60) has a tapered reduced front end region.
8. An integrated circuit package comprising a body containing one or more integrated circuits a first



12b, 12c and 12d as is the second end frame 13 increased by its corners. The receptacle 10 thus inherently provides a high resistance to deformation. The rails 17, 18 and the base contact section 16 provide a good support structure with an adequate flexibility without the need for other intermediate parts and allow the plug pin 30 to be supported in a stable fashion with a good firm contact.

Fig. 9 depicts a modified contact arrangement representing another embodiment of the invention. In this arrangement, a receptacle 50 again formed from an integral metal sheet into the rectangular front and rear frames receives a plug pin 60. One side of the receptacle is defined by a pair of parallel longitudinal upper contact rails 51 and 52 which are cantilevered springs integral with the front frame 53 only. The base wall portions of the front and rear frames are joined by a flat integral base wall region and the side wall portions of the frames adjoin opposed elongate side walls of the receptacle 50. The curved base contact section 16 of Fig. 5 is thus omitted in this construction and the plug pin 60 contacts the flat base wall region and the cantilevered contact rails 51, 52 as shown in Fig. 10. The plug pin 60 again has arcuate side edges 61, 62 or an arcuate upper face which engage the contact rails 51, 52 of the receptacle 50 with proper contact and the side edges of the plug pin 60 are precluded from premature wear.

A highly durable mating contact can be achieved by treating the appropriate surfaces of the plug pins 30, 60 and receptacles 10, 50 as in a multi-layered fashion including, for example, a palladium alloy plating process or a harder noble-metal (for example, gold) plating process with heat-treatment.

Claims

1. A contact arrangement for an electrical connector composed of a plug pin (30, 60) and a receptacle (10, 50), the plug pin (30, 60) being insertable into the receptacle (10, 50) and the receptacle (10, 50) being formed from metal sheet shaped to define first and second spaced apart frames (12, 13), at least the first frame defining an opening for receiving the plug pin (30, 60) and including a base member (14, 53), two side members (19, 20) extending perpendicularly from each side of the base member and a top opposite the base member formed from two separate top members extending toward each other from each respective side member; the receptacle further comprising a base contact region (16, 53) extending between the frames (12, 13) and a pair of resilient contact rails (17, 18, 51, 52) of rectangular cross-section extending respectively from each of the top members of the first frame towards the second frame opposite the base contact region; wherein the contact rails (17, 18, 51, 52) are continuously curved inwardly toward the base contact region (16, 53) in a direction away from the top members of said first frame; wherein the top members of said members of said first frame and the contact rails (17, 18, 51) are touching or closely adjacent one another when the plug pin (30, 60) is separated from the receptacle so that the first frame is substantially closed but when the pin (30, 60) is inserted into the receptacle, the pin (30, 60) engages the base contact region (16, 53) and the contact rails (17, 18, 51, 52) to cause the side members (19, 20) of the first frame to swing outward thus separating the first and second contact rails (17, 18, 51, 52); and wherein the plug pin (30, 60) has an arcuate surface or surfaces (31, 32, 61, 62) the or each of which is contacted by the contact rails (17, 18, 51, 52) when the plug pin is received by the receptacle.
2. A contact arrangement according to Claim 1, wherein said base contact region (16) is resilient and is curved inwardly toward the first and second contact rails, (17, 18).
3. A contact arrangement according to Claim 1 or 2, wherein the second frame (13) is also composed of a base member (16) two side members (19, 20) extending perpendicularly from each side of the base member and a top opposite the base member formed from two separate top members extending towards each other from each respective side member and both ends of both the first and second contact rail (17, 18) are in contact with the respective upper wall portions of the first and second frames (12, 13).
4. A contact arrangement according to Claim 1 or 2, wherein one end of each of the first and second contact rails is free and the first and second contact rails thereby act like cantilever springs.
5. A contact arrangement according to any one of Claims 1 to 4, wherein a terminal (21) extends outwardly from the second frame (13) remote from the base contact region (16).
6. A contact arrangement according to any one of Claims 1 to 5, wherein the plug pin (30, 60) is an electrically conductive solid component.
7. A contact arrangement according to any one of Claims 1 to 6, wherein the plug pin (30, 60) has a tapered reduced front end region.
8. An integrated circuit package comprising a body containing one or more integrated circuits a first



connector attached to said body and a second connector for mating with the first connector, the first connector having a body (79) mounting a plurality or plug pins (30, 60) having terminals (78b), the terminals being electrically connected to the integrated circuits within the body, the second connector (72) having a plurality of apertures (73) formed in a grid like array in which are disposed a plurality of receptacles (10, 50) engageable with the pins (30, 60) of the first connector, each receptacle (10, 50) having a terminal (21) allowing respective individual connection thereto; each plug pin (30, 60) being a solid component with at least some rounded-off corners (31, 32, 61, 62) and each receptacle (10, 50) being formed from metal sheet shaped to define first and second spaced apart frames (12, 13), at least the first frame defining an opening for receiving the plug pin (30, 60) and including a base member (14, 53), two side members (19, 20) extending perpendicularly from each side of the base member and a top opposite the base member formed from two separate top members extending toward each other from each respective side member; each receptacle further comprising a base region (16, 53) extending between the frames (12, 13) and a pair of resilient contact rails (17, 18, 51, 52) of rectangular cross-section extending respectively from each of the top members of the first frame towards the second frame opposite the base contact region; wherein the contact rails (17, 18, 51, 52) of each receptacle are continuously curved inwardly toward the base contact region (16, 53), in a direction away from the top member of said first frame; the top members of said first frame and the contact rails (17, 18, 51, 52) are touching or closely adjacent one another when the associated plug pin (30, 60) of the first connector is separated from the receptacle (10, 50) so that the first frame is substantially closed but when the pin (30, 60) is inserted into the receptacle (10, 50) the pin (30, 60) engages the base contact region (16, 53) and the first and second contact rails (17, 18, 51, 52) to cause the side members (19, 20) of the first frame to swing outward thus separating the first and second contact rails (17, 18, 51, 52).

9. A plug and socket arrangement comprising a socket (72) and a plug with a body (79) mounting a plurality of plug pins (30, 60) wherein the socket (72) is composed of means defining an array of holes (73) containing receptacles (10, 50) engageable with the pins of the body (79), the receptacles (10, 50) and plug pins (30, 60) having terminals (21, 78b) allowing respective connection thereto, each plug pin (30, 60) being a solid component with at least some rounded-off corners

(31, 32, 61, 62) and each receptacle (10, 50) being formed from metal sheet shaped to define first and second spaced apart frames (12, 13), at least the first frame defining an opening for receiving the associated plug pin (30, 60) and including a base member (14, 53), two side members (19, 20) extending perpendicularly from each side of the base member and a top opposite the base member formed from two separate top members extending toward each other from each respective side member; each receptacle further comprising

a base region (16, 53) extending between the frames (12, 13) and a pair of resilient contact rails (17, 18, 51, 52) of rectangular cross-section extending respectively from each of the top members of the first frame towards the second frame opposite the base contact region; wherein the contact rails (17, 18, 51, 52) are continuously curved inwardly toward the base contact region (16, 53) in a direction away from the top members of said first frame; the top members of said first frame and the contact rails (17, 18, 51, 52) are touching or closely adjacent one another when the associated plug pin (30, 60) is separated from the receptacle (10, 50) so that the first frame is substantially closed but when the pin (30, 60) is inserted into the receptacle (10, 50), the pin (30, 60) engages the base contact region (16, 53) and the first and second contact rails (17, 18, 51, 52) to cause the side members (19, 20) of the first frame to swing outward thus separating the first and second contact rails (17, 18, 51, 52).

Patentansprüche

1. Kontakthanordnung für einen elektrischen Verbinder, umfassend einen Steckkontaktstift (30, 60) und eine Buchse (10, 50), wobei der Steckkontaktstift (30, 60) in die Buchse (10, 50) einführbar ist und die Buchse (10, 50) aus einem Metallblech ausgebildet ist, welches derart geformt ist, daß erste und zweite, im Abstand angeordnete Rahmen (12, 13) gebildet werden, wenigstens der erste Rahmen eine Öffnung zur Aufnahme des Steckkontaktstifts (30, 60) bildet und ein Basisteil (14, 53), zwei Seitenteile (19, 20), welche senkrecht von jeder Seite des Basisteils ausgehen und eine Oberseite umfaßt, die dem Basisteil gegenüberliegt, und von zwei gesonderten Oberteilen gebildet wird, welche ausgehend von dem jeweiligen Seitenteil aufeinander zu verlaufen; wobei die Buchse ferner aufweist

einen Basiskontaktbereich (16, 53), welcher zwischen den Rahmen (12, 13) verläuft und ein Paar von federnd nachgiebigen Kontakt-schienen (17, 18, 51, 52) mit rechteckförmigem



- Querschnitt, welche jeweils von den Oberteilen des ersten Rahmens ausgehen und sich in Richtung zu dem zweiten Rahmen dem Basiskontaktbereich gegenüberliegend erstrecken, wobei die Kontaktschienen (17, 18, 51, 52) kontinuierlich nach innen in Richtung auf den Basiskontaktbereich (16, 53) in einer Richtung von den Oberteilen des ersten Rahmens weg gekrümmt sind; wobei die Oberteile der Teile des ersten Rahmens und die Kontaktschienen (17, 18, 51) einander berühren oder einander eng benachbart sind, wenn der Steckkontaktstift (30, 60) von der Buchse getrennt ist, so daß der erste Rahmen im wesentlichen geschlossen ist, wenn aber der Steckkontaktstift (30, 60) in die Buchse eingeführt ist, der Steckkontaktstift (30, 60) mit dem Basiskontaktbereich (16, 53) und den Kontaktschienen (17, 18, 51, 52) zusammenarbeitet, um zu bewirken, daß die Seitenteile (19, 20) des ersten Rahmens nach außen schwenken und somit die ersten und zweiten Kontaktschienen (17, 18, 51, 52) trennen, und wobei der Steckkontaktstift (30, 60) eine gekrümmte Oberfläche oder Oberflächen (31, 32, 61, 62) hat, die jeweils durch die Kontaktschienen (17, 18, 51, 52) kontaktiert werden, wenn der Steckkontaktstift mit Hilfe der Buchse aufgenommen ist.
2. Kontaktanordnung nach Anspruch 1, bei der der Basiskontaktbereich (16) federnd nachgiebig ausgelegt ist und nach innen in Richtung auf die ersten und zweiten Kontaktschienen (17, 18) gekrümmt ausgebildet ist. 30
 3. Kontaktanordnung nach Anspruch 1 oder 2, bei der der zweite Rahmen (13) ebenfalls ein Basisteil (16), zwei Seitenteile (19, 20), welche senkrecht von der jeweiligen Seite des Basisteils ausgehen und eine Oberseite umfaßt, die dem Basisteil gegenüberliegt und von zwei gesonderten Oberteilen gebildet wird, die in Richtung aufeinander, ausgehend von dem jeweiligen Seitenteil verlaufen, und bei der die beiden Enden der ersten und zweiten Kontaktschienen (17, 18) in Kontakt mit den zugeordneten Wandabschnitten der ersten und zweiten Rahmen (12, 13) sind. 40
 4. Kontaktanordnung nach Anspruch 1 oder 2, bei der ein Ende der jeweiligen ersten und zweiten Kontaktschiene frei ist und die ersten und zweiten Kontaktschienen wie einseitig eingespannte Federn wirken. 50
 5. Kontaktanordnung nach einem der Ansprüche 1 bis 4, bei der ein Anschluß (21) sich von dem zweiten Rahmen (13) entfernt von dem Basiskontaktbereich (16) nach außen erstreckt. 55
 6. Kontaktanordnung nach einem der Ansprüche 1 bis 5, bei der der Steckkontaktstift (30, 60) ein elektrisch leitendes, massives Bauteil ist.
 7. Kontaktanordnung nach einem der Ansprüche 1 bis 6, bei der der Steckkontaktstift (30, 60) einen konisch reduzierten vorderen Endbereich hat.
 8. Integriertes Schaltungspaket, welches einen Körper aufweist, welcher eine oder mehrere integrierte Schaltungen enthält, ferner einen ersten Verbinder aufweist, der an dem Körper angebracht ist, und einen zweiten Verbinder aufweist, welcher passend zu dem ersten Verbinder ausgelegt ist, der erste Verbinder einen Körper (79) zur Anordnung einer Mehrzahl von Steckkontaktstiften (30, 60) hat, welche Anschlüsse (78b) besitzen, die Anschlüsse elektrisch mit den integrierten Schaltungen in dem Körper verbunden sind, der zweite Verbinder (72) eine Mehrzahl von Öffnungen (73) hat, welche in Form einer gitterähnlichen Anordnung ausgebildet sind, in der eine Mehrzahl von Buchsen (10, 50) angeordnet sind, welche mit den Steckkontaktstiften (30, 60) des ersten Verbinders zusammenarbeiten können, jede Buchse (10, 50) einen Anschluß (21) hat, welcher jeweils individuelle Verbindungen gestattet; jeder Steckkontaktstift (30, 60) von einem massiven Bauteil mit wenigstens einigen abgerundeten Ecken (31, 32, 61, 62) gebildet wird und jede Buchse (10, 50) von einem Metallblech gebildet wird, welches derart geformt ist, daß erste und zweite, im Abstand angeordnete Rahmen (12, 13) gebildet werden, wenigstens der erste Rahmen eine Öffnung zur Aufnahme des Steckkontaktstiftes (30, 60) bildet und ein Basisteil (14, 53), zwei Seitenteile (19, 20), welche von jeder Seite des Basisteils aus sich senkrecht weg erstrecken und ein Oberteil umfaßt, welches dem Basisteil gegenüberliegt und von zwei gesonderten Oberteilen gebildet werden, welche ausgehend von dem jeweiligen Seitenteil aufeinander zu verlaufen; jede Buchse ferner einen Basisbereich (16, 53) aufweist, welcher sich zwischen den Rahmen (12, 13) erstreckt, und ein Paar von federnd nachgiebigen Kontaktschienen (17, 18, 51, 52) mit rechteckförmigem Querschnitt, welche sich jeweils von dem Oberteil des ersten Rahmens aus in Richtung zu dem zweiten Rahmen dem Basiskontaktbereich gegenüberliegend erstrecken; wobei die Kontaktschienen (17, 18, 51, 52) jeder Buchse kontinuierlich in Richtung nach innen auf den Basiskontaktbereich (16, 53) zu in einer Richtung von dem Oberteil des ersten Rahmens weg gekrümmt sind; die Oberteile des ersten Rahmens und die Kontaktschienen (17, 18, 51, 52) einander berühren oder einander eng benachbart liegen, wenn der zuge-



ordnete Steckkontaktstift (30, 60) des ersten Verbinders von der Buchse (10, 50) getrennt ist, so daß der erste Rahmen im wesentlichen geschlossen ist, wenn der Steckkontaktstift (30, 60) aber in die Buchse (10, 50) eingeführt ist, der Steckkontaktstift (30, 60) mit dem Basiskontaktbereich (16, 53) und den ersten und zweiten Kontaktschienen (17, 18, 51, 52) zusammenarbeitet, um zu bewirken, daß die Seitenteile (19, 20) des ersten Rahmens nach außen schwenken und somit die ersten und zweiten Kontaktschienen (17, 18, 51, 52) voneinander trennen.

9. Steck- und Buchsenanordnung, welche eine Buchse (72) und ein Steckteil mit einem Körper (79) aufweist, an welchem eine Mehrzahl von Steckkontaktstiften (30, 60) vorgesehen ist, wobei die Buchse (72) von einer Einrichtung gebildet wird, welche eine Gruppe von Öffnungen (73) bildet, welche in den Buchsen (10, 50) enthalten sind und mit den Steckkontaktstiften des Körpers (79) zusammenarbeiten, die Buchsen (10, 50) und die Steckkontaktstifte (30, 60) Anschlüsse (21, 78b) haben, welche jeweils eine Verbindung hiermit gestatten, jeder Steckkontaktstift (30, 60) von einem massiven Bauteil mit wenigstens einigen abgerundeten Ecken (31, 32, 61, 62) gebildet wird und jede Buchse (10, 50) von einem Metallblech gebildet wird, welches derart geformt ist, daß erste und zweite, im Abstand angeordnete Rahmen (12, 13) gebildet werden, wenigstens der erste Rahmen eine Öffnung zur Aufnahme des zugeordneten Steckkontaktstifts (30, 60) bildet und ein Basisteil (14, 53), zwei Seitenteile (19, 20), welche sich senkrecht von der jeweiligen Seite des Basisteils aus wegerstrecken und eine Oberseite umfaßt, die dem Basisteil gegenüberliegt und von zwei gesonderten Oberteilen gebildet wird, die ausgehend von dem jeweiligen Seitenteil aufeinander zu verlaufen; jede Buchse ferner folgendes aufweist

einen Basisbereich (16, 53), welcher zwischen den Rahmen (12, 13) und einem Paar von federnd nachgiebigen Kontaktschienen (17, 18, 51, 52) mit rechteckförmigem Querschnitt verläuft, welche sich jeweils ausgehend von den Oberteilen des ersten Rahmens in Richtung zu dem zweiten Rahmen dem Basiskontaktbereich gegenüberliegend erstrecken; wobei die Kontaktschienen (17, 18, 51, 52) kontinuierlich nach innen in Richtung zu dem Basiskontaktbereich (16, 53) in eine Richtung von den Oberteilen des ersten Rahmens weg gekrümmt sind, die Oberteile des ersten Rahmens und die Kontaktschienen (17, 18, 51, 52) einander berühren oder einander eng benachbart sind, wenn der zugeordnete Steckkontaktstift (30, 60) von der Buchse (10, 50) getrennt ist, so daß der erste Rahmen im we-

sentlichen geschlossen ist, wenn aber der Steckkontaktstift (30, 60) in die Buchse (10, 50) eingeführt ist, der Steckkontaktstift (30, 60) mit dem Basiskontaktbereich (16, 53) und den ersten und zweiten Kontaktschienen (17, 18, 51, 52) zusammenarbeitet, um zu bewirken, daß die Seitenteile (19, 20) des ersten Rahmens nach aussen geschwenkt werden und somit die ersten und zweiten Kontaktschienen (17, 18, 51, 52) voneinander getrennt werden.

Revendications

1. Un agencement de mise en contact pour un connecteur électrique composé d'une broche (30, 60) et d'une prise de courant (10, 50), la broche (30, 60) étant insérable dans la prise de courant (10, 50) et la prise de courant (10, 50) étant formée à partir d'une tôle métallique conformée pour définir un premier et un second cadres (12, 13) espacés l'un de l'autre, au moins le premier cadre définissant une ouverture pour recevoir la broche (30, 60) et comprenant un élément de base (14, 53), deux éléments latéraux (19, 20) s'étendant perpendiculairement à partir de chacun des côtés de l'élément de base et un dessus à l'opposé de l'élément de base, formé de deux éléments de dessus distincts s'étendant l'un vers l'autre à partir de chacun des éléments latéraux respectifs, la prise de courant comprenant en outre une région de contact de la base (16, 53) s'étendant entre les cadres (12, 13) et une paire de lames de contact élastiques (17, 18, 51, 52) de section rectangulaire s'étendant respectivement entre chacun des éléments de dessus du premier cadre en direction du second cadre à l'opposé de la zone de contact de la base; dans lequel les lames de contact (17, 18, 51, 52) sont incurvées en continu vers l'intérieur et vers la zone de contact de la base (16, 53) dans une direction s'éloignant des éléments de dessus du dit premier cadre; dans lequel les éléments de dessus desdits éléments du dit premier cadre et les lames de contact (17, 18, 51, 52) se touchent mutuellement ou sont très proches les uns des autres lorsque la broche (30, 60) est séparée de la prise, de sorte que le premier cadre soit pratiquement fermé, mais que lorsque la broche (30, 60) est insérée dans la prise, cette broche (30, 60) vienne en contact avec la zone de contact de la base (16, 53) et avec les lames de contact (17, 18, 51, 52) pour obliger des éléments latéraux (19, 20) du premier cadre à pivoter vers l'extérieur en séparant ainsi les premières et secondes lames de contact (17, 18, 51, 52); et dans lequel la broche (30, 60) une ou plusieurs surface(s) arquée(s) (31, 32, 61, 62) qui vient(viennent) en contact



avec les lames de contact (17, 18, 51, 52) lorsque la broche est insérée dans la prise.

2. Un agencement de mise en contact selon la revendication 1, dans lequel ladite zone de contact de la base (16) est élastique et est incurvée vers l'intérieur en direction des premières et secondes lames de contact (17, 18). 5
3. Un agencement de mise en contact selon la revendication 1 ou 2, dans lequel le second cadre (13) est également composé d'un élément de base (16), de deux éléments latéraux (19, 20) s'étendant perpendiculairement à partir de chacun des côtés de l'élément de base et d'un dessus à l'opposé de l'élément de base, formé de deux éléments de dessus distincts s'étendant l'un vers l'autre à partir de chacun des éléments latéraux respectifs et dans lequel les deux extrémités des deux premières et secondes lames de contact (17, 18) sont en contact avec les parties de paroi supérieures respectives des premier et second cadres (12, 13). 10 15 20
4. Un agencement de mise en contact selon la revendication 1 ou 2, dans lequel une extrémité de chacune des premières et secondes lames de contact est libre, les premières et secondes lames de contact agissant ainsi à la manière de ressorts montés en porte-à-faux. 25 30
5. Un agencement de mise en contact selon l'une quelconque des revendications 1 à 4, dans lequel une borne (21) se prolonge extérieurement à partir du second cadre (13) à distance de la zone de contact de la base (16). 35
6. Un agencement de mise en contact selon l'une quelconque des revendications 1 à 5, dans lequel la broche (30, 60) est un composant massif électriquement conducteur. 40
7. Un agencement de mise en contact selon l'une quelconque des revendications 1 à 6, dans lequel la broche (30, 60) comporte une zone d'extrémité frontale réduite et effilée. 45
8. Un bloc de circuit intégré comprenant un corps contenant un ou plusieurs circuits intégrés, un premier connecteur fixé audit corps et un second connecteur pour assemblage au premier connecteur, ce premier connecteur ayant un corps (79) pour le montage d'une pluralité de broches (30, 60) munies des bornes (78b), ces bornes étant reliées électriquement aux circuits intégrés dans ce corps, le second connecteur (72) ayant une pluralité d'ouvertures (73) ménagées en rangs à la manière d'une grille et dans lesquelles sont dis-

posées une pluralité de prises (10, 50) aptes à être engagées sur les broches (30, 60) du premier connecteur, chaque prise (10, 50) ayant une borne (21) permettant sa propre connexion individuelle; chaque broche (30, 60) étant un composant massif ayant au moins quelques angles arrondis (31, 32, 61, 62) et chaque prise de courant (10, 50) étant formée d'une tôle métallique conformée pour définir un premier et un second cadres (12, 13) espacés l'un de l'autre, au moins le premier cadre définissant une ouverture pour recevoir la broche (30, 60) et comprenant un élément de base (14, 53), deux éléments latéraux (19, 20) s'étendant perpendiculairement à partir de chacun des côtés de l'élément de base et un dessus à l'opposé de l'élément de base, formé de deux éléments de dessus distincts s'étendant l'un vers l'autre à partir de chacun des éléments latéraux respectifs, chaque prise de courant comprenant en outre une zone de la base (16, 53) s'étendant entre les cadres (12, 13) et une paire de lames de contact élastiques (17, 18, 51, 52) de section transversale rectangulaire s'étendant respectivement à partir de chacun des éléments de dessus du premier cadre en direction du second cadre à l'opposé de la zone de contact de la base; dans lequel les lames de contact (17, 18, 51, 52) sont incurvées en continu vers l'intérieur et vers la zone de contact de la base (16, 53) dans une direction s'éloignant des éléments de dessus dudit premier cadre; les éléments de dessus du dit premier cadre et les lames de contact (17, 18, 51, 52) se touchent mutuellement ou étant très proches les uns des autres lorsque la broche associée (30, 60) du premier connecteur est séparée de la prise (10, 50), de sorte que le premier cadre soit pratiquement fermé, mais que lorsque la broche (30, 60) vient être insérée dans la prise, cette broche (30, 60) est en contact avec la zone de contact de la base et avec les premières et secondes lames de contact (17, 18, 51, 52) pour obliger des éléments latéraux (19, 20) du premier cadre à pivoter vers l'extérieur en séparant ainsi les premières et secondes lames de contact (17, 18, 51, 52).

9. Un agencement à fiche et douille comprenant une douille (72) et une fiche avec un corps (79) dans lequel sont montés une pluralité de broches (30, 60), dans lequel la douille (72) est composée de moyens définissant une matrice de trous (73) contenant des prises (10, 50) aptes à être engagées sur les broches du corps (79), les prises (10, 50) et les broches (30, 60) étant munies de bornes (21, 78b) permettant leur connexion mutuelle, chaque broche (30, 60) étant un composant massif ayant au moins quelques angles arrondis (31, 32, 61, 62) et chaque prise de courant (10,



50) étant formée d'une tôle métallique conformée pour définir un premier et un second cadres (12, 13) espacés l'un de l'autre, au moins le premier cadre définissant une ouverture pour recevoir la broche associée (30, 60) et comprenant un élément de base (14, 53), deux éléments latéraux (19, 20) s'étendant perpendiculairement à partir de chacun des côtés de l'élément de base et un dessus à l'opposé de l'élément de base, formé de deux éléments de dessus distincts s'étendant l'un vers l'autre à partir de chacun des éléments latéraux respectifs, chaque prise de courant comprenant en outre une zone de base (16, 53) s'étendant entre les cadres (12, 13) et une paire de lames de contact élastiques (17, 18, 51, 52) de section transversale rectangulaire s'étendant respectivement à partir de chacun des éléments de dessus du premier cadre en direction du second cadre à l'opposé de la zone de contact de base; dans lequel les lames de contact (17, 18, 51, 52) sont incurvées en continu vers l'intérieur et vers la zone de contact de base (16, 53) dans une direction s'éloignant des éléments de dessus dudit premier cadre: les éléments de dessus dudit premier cadre et les lames de contact (17, 18, 51, 52) se touchant mutuellement ou étant très proches les uns des autres lorsque la broche associée (30, 60) du premier connecteur est séparée de la prise (10, 50), de sorte que le premier cadre soit pratiquement fermé, mais que lorsque la broche (30, 60) est insérée dans la prise (10, 50), cette broche (30, 60) soit en contact avec la zone de contact de base (16, 53) et avec les premières et secondes lames de contact (17, 18, 51, 52) pour obliger les éléments latéraux (19, 20) du premier cadre à pivoter vers l'extérieur en séparant ainsi les premières et secondes lames de contact (17, 18, 51, 52)

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