

Bridge connector for electrically connecting parallel pins

The invention relates to a bridge connector for electrically connecting mainly parallel pins, for instance, the connector pins mounted on a printed circuit board.

Conventional methods to connect such pins entail the use of a bridge or jumper contact which can be slid over the two pins to be connected see, for example, the IBM Technical Disclosure Bulletin, Vol. 8, No. 10, March 1966, at page 1327. Generally the location of a bridge contact is such that it extends above the top of said pins. The disadvantage inherent in such an earlier method of interconnection lies in the lack of space available above the pin ends, and particularly, in the inaccessibility for subsequent connection of said pins by a plurality of bridges to adjacently located pins on the printed circuit board. The latter can cause a problem especially in applications where it is necessary to mutually connect a number of pins for obtaining a desired or programmed electrical interconnection.

The above disadvantages can be overcome by utilizing an electrical bridge connector described in the present invention. This bridge connector is characterized by a substantially flat central leg of resilient, electrically conducting material and lying in a first plane, integrally formed with at least one pair of branch contacts at either side of said central leg, each pair of branch contacts comprising:

(a) a substantially flat branch lying in said first plane and connected to the central leg at one location, along the longitudinal direction of said central leg

(b) a bent branch having an offset substantially flat section lying in a second plane which extends parallel to the first plane and being of a length substantially equal to the length of said flat branch, and an interconnecting section, connecting said offset section to said central leg at another location along the longitudinal direction of said central leg, and extending between the first and second planes, the flat branch of one pair being located at one side of the central leg and the bent branch of the other pair being located at the other side of the central leg lying at the same location (I, II), said terminal being received in a hollow housing with an opening at the top, said housing having appropriate parallel channels in opposite inner walls and in two parallel planes for receiving the free ends of the branch contacts during the insertion of the terminal into the housing, the arrangement being such that when sliding such bridge connector onto two adjacent parallel pins each pin will be gripped and held by the flat branch lying at the one location and the offset section lying at the other location together constituting one pair so that opposite torsional moments are exerted by the two pins on the bridge connector.

The bridge connector comprising the bridge

contact assembled in the housing will preferably be of such dimensions that once the first bridge connector has been connected to two pins and is flush with a printed circuit board, at least a second bridge connector can be stacked above the first to enable interconnection of a third pin adjacent to the initial two pins contacted in the printed circuit board. This method can be conveniently used to mutually connect a number of pins according to a predetermined circuit interconnection. A primary advantage of this bridge connector is that the bridge contact is located in the space between adjacent pins, an area which otherwise would be redundant and not be utilized. This feature is particularly suitable to facilitate optimum space utilization in packaging systems with a high population density of pins on the printed circuit board. Provided that the bridge connectors of this invention are sufficiently small and there is adequate pin length, the free protruding pin ends can be freely utilized for subsequent interconnection to other pins.

As a matter of fact these bridge connectors can be utilized in conjunction with printed circuit boards of various designs.

Furthermore the use of these bridge connectors is not limited only to the interconnection of pins mounted in printed circuit boards. Neither are the dimensions of the bridge connector restricted to those complying with the space available between pins on the printed circuit board.

As explained earlier, once the bridge connector is mounted over two pins, opposing torsional moments are generated by each pair of branch contacts contacting the two pins. Thus the resultant force exerted finally on the central leg is insignificant. This feature is useful to compensate for possible mutual deviations in an array of pins in any localized area in the printed circuit board. Typical contributors to these deviations are:

(a) skew of pin;

(b) nonparallelism of the faces of square pins;

(c) variation in pin cross-sectional dimensions;

(d) tolerance deviations in the position of holes, and hence pins, on the printed circuit board.

When the bridge contact is assembled in the housing, the free end of each branch contact is located in the corresponding housing channel, separated by an interposing ridge. These free ends are then supported on the sides of a ridge to give a preloaded condition which is beneficial towards:

(a) a reduction of insertion force of the pin entering each branch contact;

(b) facilitating a proper centering of the bridge contact with respect to the lead in holes for pins, such that these pins can be introduced

easily into the connector.

Preferably the central leg comprises an elongation at one end consisting of a neck portion and a shoulder portion. The neck portion is bent perpendicularly to the plane of the central leg, while a broadened shoulder portion at the end of the neck portion is parallel to the previously mentioned first and second levels. The edges of the broadened shoulder portion are received in two opposing channels in the housing which are parallel to the central leg of the bridge contact. Preferably these channels, are located in the open portion of the housing side wall perpendicular to the said levels.

Preferably barbs are provided at the sides of the shoulder portion. Hence when the bridge contact is inserted into the enclosure, these barbs dig into the plastic material of the appropriate housing channel. The shoulder portion has a hole in which an electrical test probe can be anchored.

The free ends of the branch contact have a localized sectional profile shaped to facilitate easy entry of the pin. Such local profiles may be spherical or cylindrical in shape depending on sectional profile and shape of the pin to be used. These pins may have a rectangular, round or even an oval cross section. Appropriate choice of the local sectional profile of the branch contact will be made to allow the most suitable electrical connection and contacting means.

At the inner bottom surface of the housing is located a cavity. This receives the elongated portion of the central leg opposite to the shoulder portion. This further enhances the stability and locking of the bridge contact in the housing.

Instead of having one housing for each bridge contact, a plurality of bridge contacts can be assembled longitudinally adjacent or side-by-side in an appropriately formed housing with a plurality of cavities for the bridge contacts. Such a housing with multiple cavities to support the bridge contacts will then also have an identical number of holes at the bottom for pin introduction.

The invention will now be further elucidated with reference to the drawings showing possible embodiments.

FIG. 1 shows an embodiment of a bridge connector according to the present invention which bridge connector for the sake of clarity is removed from the housing;

FIGS. 2, 3 and 4 show a front view, a side view and a bottom view, respectively, of an embodiment of the bridge connector of the present invention;

FIG. 5 shows an example of a housing for a bridge connector of the present invention in which for sake of clarity one side wall has been omitted;

FIGS. 6, 7 and 9 show a top view, a front view and a side view, respectively, of a bridge connector of the present invention, located in the corresponding housing;

FIG. 9 shows as an example how several bridge connectors of the present invention can be used for connecting pins on a printed circuit board;

FIG. 10 shows an embodiment of a housing for receiving several bridge connector terminals.

The bridge connector terminal, shown in FIG. 1 and more in detail in FIGS. 2, 3 and 4, comprises a central leg 4, positioned vertically in FIG. 1, having at either sides two pairs of branch contacts 16 to 19. These branch contacts are integral with the central leg 4, as well as the broadened portion 8 shown at the top. The bridge connector terminal can be made by punching sheet material, in which it can be suitably bent and, if necessary, provided with a plating layer or lining.

The first pair of branch contacts 17 and 16 extend in FIG. 1 to the left of the central leg 4 and the second pair of branch contacts 18 and 19 extend to the right of this central leg 4. Each terminal consists of branches 17 and 19 respectively, extending in the same plane as the central leg as shown in the bottom view of FIG. 4, together with bent branch contacts 16 and 18 respectively. These bent branch contacts extend partly in a second plane which is parallel to the plane of the branch contacts 17 and 19 and central leg 4. The bent branch contacts 16 and 18 comprise a first portion 22, starting at the central leg 4 and bent in a direction almost perpendicular to and away from the plane of this central leg. In a second plane these bent branch contacts are rebent again, after which the second portion extends mainly in the same direction as the unbent flat branch contacts 17 and 19, and hence extending in the second plane.

Each branch contact is provided towards its ends with contact means, such as domes 1 and 2. These contact domes are applied on the sides of the branch contacts 16, 17, 18 and 19. These domes are turned towards each other as shown in FIGS. 3 and 4. The contact domes 1 and 2 may be spherical or cylindrical or any combination thereof depending on the pins used in their application. Such pins may have a cylindrical cross section, an oval cross section or a rectangular cross section. The shape of the contact dome has to be such that a good electrical contact is obtained with the cooperating pin to promote a high specific pressure at the connections. A simultaneous insertion of the pins between the contact domes in the branch contacts should be facilitated. In the figures these contact domes are spherical, a shape generally referred for connection with pins having a rectangular cross section, i.e., having flat side surfaces. When cylindrical pins are to be used, the contact domes will preferably be cylindrical in shape. The center line of the cylindrical contact domes may then run parallel to the center line of the cylindrical pins, but may also be perpendicular to the center lines of these pins.

One pin of the printed circuit board, not shown in FIG. 1 through 4, will be slid between the branch contact 17 and 16 between the contact domes 2 and 1, respectively, on these branch contacts. The second pin will be slid between the branch contacts 18 and 19, and hence between the contact domes 1 and 2 on these branch contact. As shown in FIG. 2 and 3, the bent branch contacts 16 and 18 are provided at the bottom with a swagged edge 3 to facilitate the entry of the pins. This swagged edge also facilitates insertion of the bridge connector terminal into the dielectric housing 24.

On top of the branch contacts 17 and 18, FIGS. 1, 2 and 3, the central leg 4 is bent through 90°, so that a neck portion 5 is obtained. This portion is rebent through 90° to obtain a broadened shoulder portion 8. This shoulder portion 8 extends in a plane which is parallel to the plane of the central leg 4 and branch contacts 17 and 19. The shoulder portion 8 comprises a hole 7 and barbs 6 at the edges. This hole 7 is used for facilitating contact with an electrical test probe during circuit testing, but also can be used as an anchor or clamping mechanism during introduction of the bridge connector terminal in the housing 24, or its removal therefrom.

At the bottom side in FIGS. 1, 2 and 3 the central leg 4 is provided with an elongated portion 20. This elongated portion fits in a corresponding cavity 27 provided at the inner bottom of housing 24. In so doing, the bridge contact is firmly anchored after assembly in the housing 24.

The housing 24 is shown in FIG. 1 and in a more detailed fashion in FIG. 5. FIGS. 6, 7 and 8 show the bridge contact terminal after assembly in the housing.

In FIG. 1, the enclosure 24 consists of a rectangular hollow box which is open at the top and closed at the bottom with the exception of holes 14, as shown in FIG. 5, 7 and 8 for pin introduction, not shown in these figures.

The narrow inner side-walls of the enclosure opposite to each other are provided with channels 10 and 11, interposed by a ridge 12. These channels and ridge extend almost to the bottom of the enclosure. The back wall of the enclosure 24 is provided with an opening 25 whose parallel vertical side-edges have channels 9 provided. The bottom edge of this opening comprises of a step 26, as shown in FIG. 5 and 8. The front wall of the enclosure 24 has a ridge 13 which extends from the bottom to almost midway the height of the enclosure. Also this ridge 13 extends from the front wall towards the rear wall of the enclosure. Between the ridge 13 and rear wall is a slot, the width of which corresponds with the thickness of the central leg 4 of the branch connector terminal. Further the front wall as well as the rear wall are provided with ridges 15, extending until about halfway the height of ridge 13. Ridges 12 are flush with the side walls of the

holes 14 and serve as guiding surface for the pins in the enclosure 24.

The entry holes 14 are widened to the bottom as shown in FIG. 7 and 8, which then tapers to facilitate the lead-in of the pins into the enclosure. Also the enclosure 24 comprises the said cavity 27 for receiving the elongated portion 20 of the central leg 4.

In FIG. 1 the dotted lines show how the bridge connector terminal can be introduced into the enclosure 24. During this process the terminal is lowered until the ends of the bent branch contacts 16 and 18 are guided into channels 11, while the ends of the nonbent branch contacts 17 and 18 enter into the channels 10 on either side of ridge 12. See the plan view in FIG. 6. Upon pressing further downwardly the broadened shoulder portion 8 will slide into channels 9 at both sides of the recess 25 in the rear wall. The neck portion 5 of the central leg will then lie in the step recess 26 located at the bottom edge of recess 25 as also shown in FIGS. 5 and 8. Barbs 6 at either side of the shoulder portion 8 dig into the material of enclosure 24. The bridge connector terminal will be thus locked in position within the housing and cannot be removed unintentionally. The central leg 4 will be received in the slot between ridge 13 and the back wall of housing 24, whereas the elongated portion 20 will be received by the cavity 27 in housing 24.

The branch contacts 17, 16 and 18, 19, respectively, are bent towards each other prior to assembly in the housing. During assembly in the housing, ridge 12 moves the branches away from each other. This gives the branch contacts a certain preload.

By combination of barbs 6, the elastic clamp connection of the branch contacts and the friction of the elongated portion 20 in the cavity 27, the bridge contact is immobilized in the housing. Hence, when the pins enter the housing through holes 14, the bridge contact is not pushed out of the housing through the opening at the top.

Ridge 13 is useful in centering the bridge connector assembly in the housing 24 and also in preventing possible movement of the bridge connector terminal during termination to the pins.

Excessive movement of the branch contacts 16 to 19 during termination to the pins is limited by the small dimensions of the channels 10 and 11. The above also results in accurate positioning of the housing with respect to the terminated pins. As shown in FIG. 8, the central leg 4 and the nonbent branches 17 and 19 are flush with the inner surface of the back wall of housing 24 and, therefore, are also flush with the edge of the entry holes 14. The same applies to the bent branches 16 and 18 at the opposite side walls of the entry holes 14. This results in a proper pin guidance through the bridge connector. This also prevents the bridge connector assembly and housing from being

skewed with respect to the pins and thus prevents oversteering of the branch contacts.

Carrier strip 21 is shown in dotted lines in Figure 1. This strip is used in the fabrication process for the bridge connector terminals. At the lower edge of this strip, a plurality of bridge connector terminals can be formed. Subsequently these are detached from strip 21. However, strip 21 is not necessary for the fabrication of these bridge connectors.

FIG. 9 shows the use of the bridge connector of the present invention for short circuiting or connecting pins 28 to 31 of the printed circuit board 32. In FIG. 9 three bridge connectors with housing 24 are terminated on pins 28 to 31, such that these four pins are connected electrically with each other. The left-hand lower bridge connector connects pins 28 and 30, the right-hand lower bridge connector connects pins 29 and 31 and the top bridge connector connects pins 30 and 31. It is shown clearly that the bridge connectors are located in a space between the different pins. The bridge connectors can be pushed further down so that the pin ends can be used for other bridge connectors or other contact means. Thus each connection pattern programming can be arranged, as desired for a particular application of the circuit on a printed circuit board.

FIG. 10 shows another embodiment of the housing, for receiving a plurality of bridge connector terminals.

The housing 33 comprises a number of cavities in which the same channels and ridges are formed as in the single housing 24 in FIGS. 1 and 2. The bottom of each housing cavity comprises two holes for the pins.

As a matter of course, many electrically conducting bridge connector terminals can be placed in housings such as shown in FIG. 10. Also these bridge connector terminals need not be positioned parallel as shown. Some connectors may be placed transversely and even on top of each other. The housing 33 in FIG. 10 is of the same height as the housing 24 in FIG. 9, so that several housings having a plurality in FIG. 9, so that several housings having a plurality of bridge connector terminals can be stacked in order to obtain a particular connecting pattern for the pins.

The present invention offers a new way for short circuiting or mutually connecting pins on a printed circuit board. This invention is particularly suitable for printed circuit boards with densely packed pins and hardware. The present invention offers the possibility of connecting components on this printed circuit board according to varying and differentiating programs. It will be clear, however, that the present invention is not limited to the interconnection of pins on printed circuit boards. However, advantageous use can be made of the space between the pins. In connection herewith, bridge connectors of the present invention generally have very small

dimensions. With the usual pin distance a single housing will have a height of for instance maximum 5.08 mm, a width along the smaller side of a maximum of once the pitch of the pins and a width along the larger side of a maximum of twice the pitch of the pins.

It will be clear that the invention is not limited to the shown and above discussed embodiments, and that modifications and adaptations are possible without departing from the scope of the present invention.

Claims

1. Bridge type connector including a bridge connector terminal for electrically interconnecting substantially parallel pins, characterized by a substantially flat central leg (4) of resilient electrically conducting material and lying in a first plane, integrally formed with at least one pair of branch contacts (16, 17; 18, 19) at either side of said central leg (4), each pair of branch contacts (16, 17; 18, 19) comprising:

(a) a substantially flat branch (17; 19) lying in said first plane and connected to the central leg at one location (I, 17; II, 19), along the longitudinal direction of said central leg (4);

(b) a bent branch having an offset, substantially flat section (16; 18) lying in a second plane which extends parallel to the first plane and being of a length substantially equal to the length of said flat branch (17; 19), and an interconnecting section (22), connecting said offset section (16; 18) to said central leg (4) at another location (II, 16; I, 18), along the longitudinal direction of said central leg (4), and extending between the first and second planes, the flat branch (17; 19) of one pair being located at one side of the central leg (4) and the bent branch (18, 10) of the other pair being located at the other side of the central leg (4) and at the same location (I, II); said terminal being received in a hollow housing (24, 33) with an opening at the top, said housing having appropriate parallel channels (10, 11) in opposite inner walls and in two parallel planes for receiving the free ends of the branch contacts during the insertion of the terminal into the housing the arrangement being such that when sliding such bridge connector onto two adjacent parallel pins (28, 30) each pin will be gripped and held by the flat branch lying at the one location and the offset section lying at the other location together constituting one pair (17, 16; 19, 18) so that opposite torsional moments are exerted by the two pins on the bridge connector.

2. Bridge connector according to claim 1, characterized in that the central leg comprises an elongation at one end, consisting of a neck portion (5), bent in a direction extending away from said second plane, and of a shoulder portion (8) being broadened with respect to the central leg, which shoulder portion is rebent at

skewed with respect to the pins and thus prevents overstressing of the branch contacts.

Carrier strip 21 is shown in dotted lines in Figure 1. This strip is used in the fabrication process for the bridge connector terminals. At the lower edge of this strip, a plurality of bridge connector terminals can be formed. Subsequently these are detached from strip 21. However, strip 21 is not necessary for the fabrication of these bridge connectors.

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The present invention offers a new way for short circuiting or mutually connecting pins on a printed circuit board. This invention is particularly suitable for printed circuit boards with densely packed pins and hardware. The present invention offers the possibility of connecting components on this printed circuit board according to varying and differentiating programs. It will be clear, however, that the present invention is not limited to the interconnection of pins on printed circuit boards. However, advantageous use can be made of the space between the pins. In connection herewith, bridge connectors of the present invention generally have very small

dimensions. With the usual pin distance a single housing will have a height of for instance maximum 5.08 mm, a width along the smaller side of a maximum of once the pitch of the pins and a width along the larger side of a maximum of twice the pitch of the pins.

It will be clear that the invention is not limited to the shown and above discussed embodiments, and that modifications and adaptations are possible without departing from the scope of the present invention.

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(a) a substantially flat branch (17; 19) lying in said first plane and connected to the central leg at one location (I, 17; II, 19), along the longitudinal direction of said central leg (4);

(b) a bent branch having an offset, substantially flat section (16; 18) lying in a second plane which extends parallel to the first plane and being of a length substantially equal to the length of said flat branch (17; 19), and an interconnecting section (22), connecting said offset section (16; 18) to said central leg (4) at another location (II, 16; I, 18), along the longitudinal direction of said central leg (4), and extending between the first and second planes, the flat branch (17; 19) of one pair being located at one side of the central leg (4) and the bent branch (18, 10) of the other pair being located at the other side of the central leg (4) and at the same location (I, II); said terminal being received in a hollow housing (24, 33) with an opening at the top, said housing having appropriate parallel channels (10, 11) in opposite inner walls and in two parallel planes for receiving the free ends of the branch contacts during the insertion of the terminal into the housing the arrangement being such that when sliding such bridge connector onto two adjacent parallel pins (28, 30) each pin will be gripped and held by the flat branch lying at the one location and the offset section lying at the other location together constituting one pair (17, 16; 19, 18) so that opposite torsional moments are exerted by the two pins on the bridge connector.

2. Bridge connector according to claim 1, characterized in that the central leg comprises an elongation at one end, consisting of a neck portion (5), bent in a direction extending away from said second plane, and of a shoulder portion (8) being broadened with respect to the central leg, which shoulder portion is rebent at



the end of the neck portion into a third plane parallel to the first and second planes, the housing containing two additional opposite channels (9) for receiving the edges of the broadened shoulder portion, said edges running parallel to the central leg.

3. Bridge connector according to claims 1 and 2, characterized in that the central leg (4) the branch contacts (16—19), the neck portion (5) and the shoulder (8) portion are formed of punched and bent electrically conducting, resilient sheet material.

4. Bridge connector according to claim 2, characterized in that the side edges of the shoulder portion (8) contain barbs (6) which dig into the housing material, said shoulder portion further comprising a hole (7) for receiving an electrical test probe.

5. Bridge connector according to claim 2, characterized in that said housing channels (9) for receiving the shoulder portion are formed in opposite edges of an open portion (25) of a side wall, said side wall being parallel to the planes of said terminal.

6. Bridge connector according to claim 5 characterized in that a ridge (12) between the channels formed in the opposite inner surfaces of the housing and running parallel with the said planes is of such width that the free ends of the branch contacts resiliently rest upon this ridge.

7. Bridge connector according to claim 6 characterized in that the free ends of the branch contacts comprise contact means on the sides towards the pins.

8. Bridge connector according to claim 2 characterized in that the central leg is elongated at the end (20) opposite the broadened shoulder end and the housing near the closed end comprises a cavity (27) for receiving said elongated end.

9. Bridge connector according to claim 6, characterized in that the inner side wall of the ridge (12) between the channels for receiving the branch contacts coincides with a side wall of holes for the entry of the pins in the housing closed end, so that the pins will rest upon the side wall of the ridge.

10. Bridge connector as claimed in claim 9 characterized in that the housing comprises a support surface for the pins opposite to the branch contacts taking the closest position within the housing said support surface coincides with a side wall of the holes (14) for the pins in the housing bottom, such that the pins are pressed upon this surface by the branch contacts.

11. Bridge connector according to claim 1 characterized in that the terminal is of such size that it can be received completely within the housing and that the housing length does not exceed half the length of the pin portions.

12. Bridge connector according to claim 1 characterized in that said housing (33) comprises a plurality of cavities, each cavity receiving and supporting a separate bridge connector terminal and holes (14) in the bottom

of each cavity for the entry of pins.

Patentansprüche

1. Brückenverbinder mit einem Brückenverbinderkontaktstück zur elektrischen Verbindung im wesentlichen paralleler Stifte, gekennzeichnet durch einen im wesentlichen flachen Mittelschenkel (4) aus elastischem elektrisch leitendem Material und in einer ersten Ebene liegend, welcher aus einem Stück geformt ist mit mindestens einem Paar von Zweigkontakten (16, 17; 18, 19) auf jeder Seite des Mittelschenkels (4), wobei jedes Paar von Zweigkontakten (16, 17; 18, 19) gebildet wird durch:

(a) einen im wesentlichen flachen Zweig (17; 19), der in der erwähnten ersten Ebene liegt und mit dem Mittelschenkel an einer Stelle (I, 17; II, 19) entlang der Längsrichtung des Mittelschenkels (4) verbunden ist;

(b) einen gebogenen Zweig mit einem versetzten, im wesentlichen flachen Abschnitt (16; 18), der in einer zweiten Ebene liegt, die sich parallel zur ersten Ebene erstreckt und von einer Länge ist, die im wesentlichen gleich der Länge des flachen Zweiges (17; 19) ist, und einen Verbindungsabschnitt (22), welcher den versetzten Abschnitt (16; 18) mit dem Mittelschenkel (4) an einer anderen Stelle (II, 16; I, 18) entlang der Längsrichtung des Mittelschenkels (4) verbindet und sich zwischen der ersten und der zweiten Ebene erstreckt, wobei der flache Zweig (17; 19) des einen Paares auf der einen Seite des Mittelschenkels (4) angeordnet ist und der gebogene Zweig (18, 10) des anderen Paares auf der anderen Seite des Mittelschenkels (4) angeordnet ist und an der gleichen Stelle (I, II); welches Kontaktstück von einem hohlen Gehäuse (24, 33) mit einer Öffnung an der Oberseite angenommen wird, welches Gehäuse passende parallele Nuten (10, 11) in gegenüberliegenden Innenwänden und in zwei parallelen Ebenen zur Aufnahme der freien Enden der Zweigkontakte beim Einsetzen des Kontaktstücks in das Gehäuse aufweist, wobei die Anordnung so getroffen ist, daß, wenn der Brückenverbinder auf zwei benachbarte parallele Stifte (28, 30) aufgeschoben wird, jeder Stift erfaßt und gehalten wird durch den flachen Zweig, der an der einen Seite liegt, und den versetzten Abschnitt, der an der anderen Seite liegt, so daß sie zusammen ein Paar (17, 16; 19, 18) bilden und entgegengesetzte Torsionsmomente durch die beiden Stifte auf den Brückenverbinder ausgeübt werden.

2. Brückenverbinder nach Anspruch 1, dadurch gekennzeichnet, daß der Mittelschenkel an einem Ende eine Verlängerung aufweist, bestehend aus einem Halsteil (5), der in einer Rich-zweiten Ebene weg erstreckt, und aus einem Schulterteil (8), der mit Bezug auf den Mittelschenkel verbreitert ist und am Ende des Halsteils in eine dritte Ebene zurückgebogen ist, die zur ersten und zur zweiten Ebene



(14)

parallel ist, wobei das Gehäuse zwei zusätzliche entgegengesetzte Nuten (9) zur Aufnahme der Kanten des verbreiterten Schulterteils enthält welche Kanten parallel zum Mittelschenkel verlaufen.

3. Brückenverbinder nach den Ansprüchen 1 und 2, dadurch gekennzeichnet, daß der Mittelschenkel (4), die Zweigkontakte (16 bis 19), der Halsteil (5) und der Schulterteil (8) aus ausgestanztem und gebogenem elektrisch leitendem elastischen flächenhaften Material geformt sind.

4. Brückenverbinder nach Anspruch 2, dadurch gekennzeichnet, daß die Seitenkanten des Schulterteils (8) Widerhaken (6) aufweisen, die sich in das Gehäusematerial eingraben, welcher Schulterteil ferner ein Loch (7) zur Aufnahme einer elektrischen Prüfsonde aufweist.

5. Brückenverbinder nach Anspruch 2, dadurch gekennzeichnet, daß die Gehäusenuten (9) zur Aufnahme des Schulterteils in entgegengesetzten Kanten eines offenen Teils (25) einer Seitenwand geformt sind, welche Seitenwand zu den Ebenen des Kontaktstücks parallel ist.

6. Brückenverbinder nach Anspruch 5, dadurch gekennzeichnet, daß eine Rippe (12) zwischen den in den entgegengesetzten Innenflächen des Gehäuses ausgebildeten Nuten vorgesehen ist, die parallel zu den erwähnten Ebenen verläuft und von solcher Breite ist, daß die freien Enden der Zweigkontakte elastisch gegen diese Rippe anliegen.

7. Brückenverbinder nach Anspruch 6, dadurch gekennzeichnet, daß die freien Enden der Zweigkontakte Kontaktmittel an den den Stiften zugekehrten Seiten aufweisen.

8. Brückenverbinder nach Anspruch 2, dadurch gekennzeichnet, daß der Mittelschenkel an dem dem verbreiterten Schulterende entgegengesetzten Ende (20) verlängert ist und das Gehäuse in der Nähe des geschlossenen Endes einen Hohlraum (27) zur Aufnahme des verlängerten Endes aufweist.

9. Brückenverbinder nach Anspruch 6, dadurch gekennzeichnet, daß die innere Seitenwand der Rippe (12) zwischen den Nuten zur Aufnahme der Zweigkontakte mit einer Seitenwand der Öffnungen für den Eintritt der Stifte in das geschlossene Gehäuseende zusammenfällt, so daß die Stifte gegen die Seitenwand der Rippe anliegen.

10. Brückenverbinder nach Anspruch 9, dadurch gekennzeichnet, daß das Gehäuse eine Trägerfläche für die Stifte entgegengesetzt zu den Zweigkontakten mit der engsten Stellung innerhalb des Gehäuses aufweist, welche Trägerfläche mit einer Seitenwand der Öffnungen (14) für die Stifte im Gehäuseboden zusammenfällt, so daß die Stifte durch die Zweigkontakte gegen diese Fläche gepreßt werden.

11. Brückenverbinder nach Anspruch 1, dadurch gekennzeichnet, daß das Kontaktstück von solcher Größe ist, daß es vollständig innerhalb des Gehäuses aufgenommen werden kann und daß die Gehäuselänge die halbe Länge der

Stifteile nicht überschreitet.

12. Brückenverbinder nach Anspruch 1, dadurch gekennzeichnet, daß das Gehäuse (33) eine Vielzahl von Hohlräumen aufweist, von denen jeder ein gesondertes Brückenverbinderkontaktstück aufnimmt und trägt, und im Boden jedes Hohlraumes Öffnungen (14) für den Eintritt von Stiften vorgesehen sind.

Revendications

1. Connecteur du type à pont comprenant une borne de connecteur à pont pour connecter électriquement des broches pratiquement parallèles, caractérisé par une branche centrale (4) pratiquement plane en matière élastique conductrice de l'électricité, située dans un premier plan et formée solidairement avec au moins une paire de contacts en branche (16, 17; 18, 19) de chaque côté de la branche centrale (4), chaque paire de contacts en branche (16, 17; 18, 19) comprenant:

(a) une branche pratiquement plane (17, 19) située dans le premier plan mentionné et connectée à la branche centrale en un endroit (I, 17; II, 19) le long de la direction longitudinale de cette branche centrale (4);

(b) une branche coudée présentant un segment décalé (16; 18) pratiquement plan situé dans un deuxième plan qui s'étend parallèlement au premier plan et ayant une longueur pratiquement égale à la longueur de la branche plane (17; 19) et un segment d'interconnexion (22) connectant le segment décalé (16; 18) à la branche centrale (4) en un autre endroit (II, 16; I, 18) le long de la direction longitudinale de la branche centrale (4) et s'étendant entre les premier et deuxième plans, la branche plane (17; 19) d'une paire étant située d'un côté de la branche centrale (4) et la branche coudée (18, 10) de l'autre paire étant située de l'autre côté de la branche centrale (4) et au même emplacement (I, II); la borne se logeant dans un logement creux (24) muni d'une ouverture au sommet et le logement présentant des canaux parallèles appropriés (10, 11) dans des parois intérieures opposées et dans deux plans parallèles pour recevoir les extrémités libres des contacts de branche pendant l'insertion de la borne dans le logement, la disposition étant telle que, lorsqu'on glisse le connecteur à pont sur deux broches parallèles adjacentes (28, 30), chaque broche soit enserrée et retenue par la branche plane située au premier endroit et le segment décalé se trouvant à l'autre endroit, constituant ensemble une paire (17, 16; 19, 18) de sorte que des moments de torsion opposés sont exercés par les deux broches sur le connecteur à pont.

2. Connecteur à pont selon la revendication 1, caractérisé par le fait que la branche centrale comprend à une extrémité un prolongement comprenant une partie de col (5) coudée en sens opposé au deuxième plan et une partie



d'épaulement (8) élargie relativement à la branche centrale, cette partie d'épaulement étant à nouveau coudée à l'extrémité de la partie de col, dans un troisième plan parallèle aux premier et deuxième plans, le logement contenant deux gorges opposées supplémentaires (9) pour recevoir les bords de la partie d'épaulement élargie, ces bords étant parallèles à la branche centrale.

3. Connecteur à pont selon les revendications 1 et 2, caractérisé par le fait que la branche centrale (4), les contacts de branche (16 à 19), la partie de col (5) et la partie d'épaulement (8) sont formés de matière en feuille élastique conductrice de l'électricité, poinçonnée et coudée.

4. Connecteur à pont selon la revendication 2, caractérisé par le fait que les bords latéraux de la partie d'épaulement (8) comportent des arillons (6) qui s'enfoncent dans la matière du logement, la partie d'épaulement comprenant en outre un trou (7) pour recevoir une sonde d'essai électrique.

5. Connecteur à pont selon la revendication 2, caractérisé par le fait que, dans le logement, des gorges (9) destinées à recevoir la partie d'épaulement sont formées dans des bords opposés d'une partie ouverte (25) d'une paroi latérale, cette paroi étant parallèle aux plans de la borne.

6. Connecteur à pont selon la revendication 5, caractérisé par le fait qu'une crête (12) située entre les gorges formées dans les surfaces intérieures opposées du logement et dirigées parallèlement auxdits plans est de largeur telle que les extrémités libres des contacts de branche reposent élastiquement sur cette crête.

7. Connecteur à pont selon la revendication 6, caractérisé par le fait que les extrémités libres

des contacts de branche comprennent des moyens de contact sur les côtés tournés vers les broches.

8. Connecteur à pont selon la revendication 2, caractérisé par le fait que la branche centrale est allongée à l'extrémité (20) opposée à l'extrémité élargie d'épaulement et que le logement présente, près de l'extrémité, une cavité (27) pour recevoir cette extrémité allongée.

9. Connecteur à pont selon la revendication 6, caractérisé par le fait que la paroi latérale intérieure de la crête (12), entre les gorges destinées à recevoir les contacts de branche, coïncide avec une paroi latérale de trous destinés à l'entrée des broches dans l'extrémité fermée du logement de sorte que les broches reposent sur la paroi latérale de la crête.

10. Connecteur à pont selon la revendication 9, caractérisé par le fait que le logement comprend une surface de support pour les broches opposées aux contacts de branche qui occupent la position la plus proche à l'intérieur du logement et que cette surface de support coïncide avec une paroi latérale des trous (14) destinés aux broches dans le fond du logement, de sorte que les broches sont poussées sur cette surface par les contacts de branche.

11. Connecteur à pont selon la revendication 1, caractérisé par le fait que la borne est de grandeur telle qu'elle peut se loger complètement dans le logement et que la longueur du logement ne dépasse pas la moitié de la longueur des parties de broche.

12. Connecteur à pont selon la revendication 1, caractérisé par le fait que le logement comprend plusieurs cavités, chaque cavité recevant et supportant une borne séparée de connecteur à pont et des trous (14) dans le fond de chaque cavité pour l'entrée des broches.

