

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 632 533 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

24.10.2001 Bulletin 2001/43

(51) Int Cl.7: **H01R 13/18**, H01R 13/115

(21) Application number: **94109551.5**

(22) Date of filing: **21.06.1994**

(54) **A flat connector socket**

Eine flache Steckverbinderbuchse

Une douille de connexion plate

(84) Designated Contracting States:
ES FR GB IT SE

(30) Priority: **29.06.1993 DE 4321549**

(43) Date of publication of application:
04.01.1995 Bulletin 1995/01

(73) Proprietor: **FRAMATOME CONNECTORS
INTERNATIONAL
92084 Paris La Défense (FR)**

(72) Inventors:

- **Müller, Steffen
D-90469 Nürnberg (DE)**

- **Bieringer, Anton
D-91126 Schwabach (DE)**

(74) Representative: **Beetz & Partner Patentanwälte
Steinsdorfstrasse 10
80538 München (DE)**

(56) References cited:

EP-A- 0 125 927

EP-A- 0 509 859

DE-U- 9 106 775

FR-A- 2 467 490

FR-A- 2 627 020

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 0 632 533 B1

Description

[0001] The invention relates to a connector having an envelope having a chamber, having further a flat connector socket, provided with a contact spring arm base having crimps, and two contact spring arms extending from the base, said arms being bent inwards towards one another over some of their length at a distance from the free ends and being bent back at such ends, said socket being provided with an overspring, supporting the socket in said chamber of said socket envelope, said overspring having a base securable to the contact spring arm base and parts extending adjacent the contact spring arms, wherein said overspring has opposed first side walls each with an end part which are bent towards one another which extend over the free ends of the contact spring arms respectively, said overspring base and said overspring parts form a peripherally closed socket member with help of opposed side walls provided with notches, whereby the end-face end of the first side walls merge into said second side walls and extend over some of their length towards the contact spring arm base.

[0002] In FR 2 627 020 there is described a contact socket for receiving a flat contact element having a notch on one side of a cage whereas the cage is forming the contact socket. The socket includes two contact spring arms. The opening degree of the two spring arms can be limited by flaps that were cut free from the contact socket. There are no grooves on lateral front sides of the contact.

[0003] In known flat connector sockets of this kind the overspring secured by way of its base to the contact spring arm base has strip-like resilient arms which are associated with the contact spring arms to provide additional force. Due to the exposed construction of the contact spring arms the known connector sockets although permitting the axial insertion of contact pins and the use of the connector in pivoting systems, have the disadvantage that the contact spring arms, being unprotected, are open to disturbing mechanical influences; also, the fixing of the socket in envelopes is unsatisfactory.

[0004] It is the object of the invention to provide a connector of the kind hereinbefore set out that provides a better fixing possibility in a chamber of an envelope.

[0005] According to the invention, therefore, the base zones of the notches serve as abutment for first projections protruding from the walls of the envelope into said chamber, and second projections are disposed resiliently on the envelope and are engageable with the socket below the end of the overspring base remote from the notches.

[0006] The notches therefore serve for a number of purposes. In addition to their protective function and facilitating unimpaired inward and outward pivoting movements of plug pins, they help to retain the connector socket in the envelope. The support members can be preferably wedge-shaped and be fixedly disposed on

deflectable support strips. When the socket is pushed into the chamber of the envelope, a component of the pushing-in force which becomes operative transversely to the displacement direction on the wedge surfaces of the support members is responsible for an automatic outwards deflection of the support strips which after passing over the support members and taking up their inner end position pivot back automatically and thus locate the socket axially in the chamber. The socket is therefore supported twice in the envelope - near its insertion end and in the zone between the contact spring arm base and the crimps. To obviate accidental bending back of the support strips, the same can subsequently be engaged from the rear by clamping members introducidible into the envelope and the socket can be locked.

[0007] Also, to enable the overspring to perform a further function resilient tongues are cut free and/or torn free in the first side walls, are bent in towards the contact spring arms and can be pressed externally thereon or extend at a distance therefrom. In this case the resilient tongues can be bent in either at an inclination to the free end of the overspring and inwardly towards the contact spring arms or at an inclination to the overspring base and inwardly towards the contact spring arms. In both constructions the resilient tongues, each of which is connected by way of a side edge to the first side walls, help to increase the contacting force.

[0008] According to another feature, impressions or the like for the pivotal reception of the free ends of the contact spring arms can be disposed over some of the depth in the first side walls. The contact spring arms can engage to various extents in the impressions or the like in response to overbending and thus be protected against deformations or the like.

[0009] Embodiments of the invention are illustrated in the drawings wherein:

Fig. 1 is a front elevation of a flat connector socket with an electrical conductor;

Fig. 2 is a view in side elevation and partly in section of a socket of the kind shown in Fig. 1;

Fig. 3 is a front elevation of a flat connector socket;

Fig. 4 is a view in side elevation and partly in section of a socket of the kind shown in Fig. 3;

Fig. 5 is a view in section of a socket of the kind shown in Fig. 2 in an envelope;

Fig. 6 is a view in section of a pivoting system with flat connector sockets;

Fig. 7 is a front elevation of a flat connector socket in an envelope, the same being shown in section;

Fig. 8 is a plan view to a reduced scale of part of an

envelope for sockets of the kind shown in Fig. 1;

Fig. 9 is a rear view of an overspring;

Fig. 10 is a plan view of an overspring;

Fig. 11 is a developed view of an overspring;

Fig. 12 is a view in side elevation and partly in section of a variant form of a flat connector socket;

Fig. 13 is a rear view of a socket of the kind shown in Fig. 12;

Fig. 14 is a front elevation of a socket of the kind shown in Fig. 12;

Fig. 15 is a view in section on the line XV-XV of Fig. 13 of a socket of the kind shown in Fig. 12;

Fig. 16 is a view in side elevation and partly in section of a part of another variant form of flat connector socket;

Fig. 17 is a rear view of a socket of the kind shown in Fig. 16;

Fig. 18 is a front view of a socket of the kind shown in Fig. 16;

Fig. 19 is a section on the line XIX-XIX of Fig. 17 through a flat connector socket;

Fig. 20 is a view in side elevation and partly in section of another flat connector socket;

Fig. 21 is a front elevation of a socket of the kind shown in Fig. 20;

Fig. 22 is a rear view of a socket of the kind shown in Fig. 20, and

Fig. 23 shows a socket in section on the line XXIII-XXIII of Fig. 22.

[0010] Referring to the drawings a flat connector socket 1 has a contact spring arm base 2 having contact spring arms 3. The same are bent in towards one another, engage one another at their free ends 3' and the free ends 3' are bent back outwardly. The contact spring arm base 2 merges into an intermediate zone 4 and crimps 5, 6. The same serve to secure electrical conductors 7 and the insulation 8 thereof. The base 2 and the contact spring arms 3 can be embodied by an appropriately bent flat piece of sheet metal.

[0011] An overspring 9, visible in Figs. 9 and 10, is embodied by an overspring base 10 and a part 11 and is secured by way of the base 10 to the contact spring

arm base 2. Base 10 and part 11 co-operate to form a peripherally closed jacket in which the contact spring arms 3 are received with protection. The side walls 11' of the part 11 have at their free end bent parts 12 which extend towards one another and over the free ends of the arms 3. The parts 12 provide mechanical protection of the contact spring arms 3 and also have a centring action when plug pins are introduced into the socket 1. Lugs 13, visible in Fig. 9, are also present in the overspring base 10 and by being bent into recesses 14 in the contact spring arm base 2 help to locate the overspring 9 axially on the contact spring arm base 2.

[0012] Second wall parts 11" which extend in the first wall parts 11' between the bent parts 12 are formed with notches 15 into which the end-face end 11''' of the second walls 11" merges and which extend over some of the length of the overspring part 11. The free ends 3' of the contact spring arms 3 are accessible from the side by way of the notches 15 so that the sockets 1 can be used for axial plugging-in of plug pins 16 and in pivoting systems 17 of the kind shown in Fig. 6. The plug pins 16 can be introduced by way of the notches 15 inclinedly and without hindrance between the contact spring arms 3 behind them.

[0013] Another function of the notches 15 is to help to support the socket 1 by co-operation with projections 20 in the front part of the socket 1, the projections 20 extending into the chamber 18 of the socket envelope 19 (Figs. 5 and 7) and being rigidly secured to such envelope. As will be apparent on the left of Fig. 5, the projections 20 are operatively associated with the base 15' of the notches 15. The projections 20 can be introduced without hindrance into the notches 15 by way of the open end thereof when the socket 1 is introduced into the chamber 18. Also, projections 21 near the contact spring arm base 3 and overspring base 10 engage below the socket 1 in the envelope chamber 18. The projections 21 are wedge-shaped and are disposed on support strips 22 rigidly secured to the envelope and adapted to flex resiliently. When the socket 1 is introduced into the chamber 18 from the bottom end the support strips 2 are first bent by the pushing-in force, the overspring 9 moves over the projections 21 and when taking up the top position shown in Fig. 5 the projections 21 pivot back below the base 3 or base 10, because of the pivoting back of the strips 22, so that the socket 1 is secured axially in the chamber 18. An additional clamping member (not shown) which is introduced into the envelope 19 and which bears on the strips 22 on the side remote from the projections 21 prevents accidental bending-out of the strips 22 and release of the socket 1. As Fig. 11 shows, the overspring 9 is embodied by a sheet metal blank 23. In the embodiment shown the same has impressions 24 which, with the overspring 9 positioned on the contact spring arm base 2, extend near the free ends of the contact spring arms 3 and possibly receive the same if they are overbent so as to prevent deformations of the arms 3.

[0014] In the embodiment shown in Figs. 12 and 13 the overspring 9 has resilient tongues 25 formed by cutting free or tearing free. In the embodiment shown in Figs. 12 to 14 the resilient tongues 25 are rigidly connected at their bottom end to the overspring 9 and are bent inwards towards the free end. Also, the tongues 25 are bent in towards one another at their free ends 25' and bear by way thereof on the contact spring arms 3 in order to provide additional force thereon to increase the contacting force.

[0015] Whereas in the embodiment shown in Figs. 12 and 13 the tongues 25 are wedge-shaped, the resilient tongues 25 of Figs. 16, 17 and 18 are made in a substantially rectangular shape by cutting free. Here again the tongues 25 are rigidly connected at their bottom end to the overspring 9 and at their top ends are bent in towards and borne on the contact spring arms 3.

[0016] In the embodiment shown in Figs. 20 - 22 resilient tongues 25 are again cut free in the overspring part 11. However, these tongues 25 are connected at their top end to the overspring 9 and at their free end are bent in towards the contact spring arm base 2 and inwardly. The bent-in ends 25' of the tongues 25 bear on the contact spring arms 3 in order to increase the contacting force.

Claims

1. A connector having:

an envelope (19) having a chamber (18), having further a flat connector socket, provided with a contact spring arm base (2) having crimps (5, 6), and two contact spring arms (3) extending from the base (2), said arms being bent inwards towards one another over some of their length at a distance from the free ends and being bent back at such ends, said socket being provided with an overspring (9), supporting the socket in said chamber of said socket envelope (19), said overspring having a base (10) securable to the contact spring arm base (2) and parts (11) extending adjacent the contact spring arms, wherein said overspring has opposed first side walls (11') each with an end part (12) which are bent towards one another which extend over the free ends of the contact spring arms respectively, said overspring base (10) and said overspring parts (11) form a peripherally closed socket member with help of opposed side walls (11'') provided with notches (15), whereby the end-face end of the first side walls (11') merge into said second side walls (11'') and extend over some of their length towards the contact spring arm base (2), and

characterized in that

the base zones of the notches (15) serve as abutment for first projections (20) protruding from the walls of the envelope (19) into said chamber (18),

and that second projections (21) are disposed resiliently on the envelope (19) and are engageable with the socket below the end of the overspring base remote from the notches (15).

2. A connector according to claim 1, **characterised in that** the second projections (21) are wedge-shaped and attached to support strips (22) deflectable by means of the overspring (9).

3. A connector according to claim 1, **characterised in that** resilient tongues (25) are cut free and/or torn free in the first side walls (11'), are rigidly disposed by way of one side edge on the first side walls (11'), have their free ends bent in towards the contact spring arms (3) and can be pressed externally thereon or extend at a distance therefrom.

4. A connector according to claim 3, **characterised in that** the resilient spring tongues (25), **attached to the side wall (11')**, have their free ends bent at an inclination to the free end of the overspring (9) and inwardly towards the contact spring arms (3).

Patentansprüche

1. Steckverbinder mit einem Aufnahmegehäuse (19), das eine Kammer (18) und weiterhin eine flache Steckerbuchse aufweist, die eine Kontaktfederarmbasis (2) mit Crimpansätzen (5, 6) aufweist und zwei sich von der Basis (2) erstreckende Kontaktfederarme (3), wobei die Arme im Abstand der freien Enden über Teillängen zueinander eingebogen und an den freien Enden zurückgebogen sind, wobei die Buchse eine Überfeder (9) aufweist, die die Buchse in der Kammer des Aufnahmegehäuses (19) abstützt, wobei die Überfeder eine in der Kontaktfederarmbasis (2) befestigte Überfederbasis (10) und Abschnitte (11) aufweist, die sich neben den Kontaktfederarmen erstrecken, wobei die Überfeder gegenüberliegende erste Seitenwandungen (11') jeweils mit einem Endabschnitt (12) aufweist, die zueinander gebogen sind und sich jeweils über die freien Enden der Kontaktfederarme erstrecken,

wobei die Überfederbasis (10) und die Überfederabschnitte (11) durch gegenüberliegende Seitenwandungen (11''), die Schlitzungen (15) aufweisen, einen umlaufend geschlossenen

Hülsenkörper bilden, wobei das stimseitige Ende der ersten Seitenwandungen (11') in die zweiten Seitenwandungen (11'') übergeht und sich über einen Teil ihrer Länge in Richtung der Kontaktfederarmbasis (2) erstreckt,

dadurch gekennzeichnet, daß die Basisabschnitte der Schlitzungen (15) ersten Stützkörpern (20) als Abstützungen dienen, die von den Wänden des Aufnahmegehäuses (19) in die Kammer (18) ragen, und daß zweite Stützkörper (21) federnd auf dem Aufnahmegehäuse (19) vorgesehen sind und unterhalb des Endes der Überfederbasis entfernt von den Schlitzungen (15) in die Buchse eingreifen können.

2. Steckverbinder nach Anspruch 1, **dadurch gekennzeichnet, daß** die zweiten Stützkörper (21) keilförmig ausgebildet sind und auf durch die Überfeder (9) auslenkbaren Trägerstreifen (22) fest angeordnet sind.

3. Steckverbinder nach Anspruch 1, **dadurch gekennzeichnet, daß** Federzungen (25) in den ersten Seitenwandungen (11') freigeschnitten und/oder freigerissen sind, fest mit einer Seitenkante an den ersten Seitenwandungen (11') befestigt sind, ihre freien Enden in Richtung der Kontaktfederarme (3) umgebogen sind und außen gegen diese ange-drückt werden oder sich in Abstand zu ihnen erstrecken können.

4. Steckverbinder nach Anspruch 3, **dadurch gekennzeichnet, daß** die elastischen Federzungen (25) an der Seitenwandung (11') befestigt sind und ihre freien Enden schräg in Richtung des freien Endes der Überfeder (9) und nach innen zu den Kontaktfederarmen (3) eingebogen sind.

Revendications

1. Un connecteur, comportant :

un boîtier (19) comprenant une alvéole (18), ayant en outre une douille de connexion plate, munie d'une base (2) de bras élastiques de contact comportant des éléments de sertissage (5, 6), et deux bras élastiques de contact (3) s'étendant depuis la base (2), lesdits bras étant pliés vers l'intérieur en direction l'un de l'autre sur une certaine partie de leur longueur à une certaine distance depuis les extrémités libres et étant repliés à ces extrémités, ladite douille étant munie d'une virole à ressorts (9) supportant la douille dans ladite alvéole dudit boîtier de douille (19), ladite virole à ressorts ayant une base (10), susceptible d'être fixée à la base (2) des bras élastiques de contact, et

des parties (11) s'étendant au voisinage des bras élastiques de contact, dans lequel ladite virole à ressorts comporte des premières parois latérales (11') opposées, ayant chacune une partie d'extrémité (12) qui sont pliées l'une vers l'autre en s'étendant sur les extrémités libres des bras élastiques de contact, respectivement,

ladite base de virole à ressorts (10) et lesdites parties de virole à ressorts (11) forment un élément de douille, dont la périphérie est fermée à l'aide de parois latérales (11'') opposées, munies d'encoches (15), de manière que l'extrémité de la face d'extrémité des premières parois latérales (11') se fonde en lesdites deuxièmes parois latérales (11'') et s'étend sur une certaine partie de leur longueur en direction de la base des bras élastiques de contact (2), et

caractérisé en ce que

les zones de bases des encoches (15) servent de butées à des premières butées (20) faisant saillie depuis les parois du boîtier (19), à l'intérieur de ladite alvéole (18),

et **en ce que** des deuxièmes butées (21) sont disposées élastiquement sur le boîtier (19) et sont susceptibles d'être mises en prise avec la douille au-dessous de l'extrémité de la base de la virole à ressorts distante des encoches (15).

2. Un connecteur selon la revendication 1, **caractérisé en ce que** les deuxièmes butées (21) sont en forme de coin et fixées à des bandes supports (22), susceptibles d'être fléchies sous l'effet de la virole à ressorts (9).

3. Un connecteur selon la revendication 1, **caractérisé en ce que** des languettes élastiques (25), qui sont obtenues par découpage et / ou obtenues par emboutissage dans les premières parois latérales (11'), sont disposées rigidement par un de leur bord latéral sur les premières parois latérales (11'), leurs extrémités libres étant pliées en direction des bras élastiques de contact (3) et pouvant être pressées extérieurement sur ceux-ci ou s'étendre à une certaine distance de ceux-ci.

4. Un connecteur selon la revendication 3, **caractérisé en ce que** les languettes élastiques (25) faisant ressort, fixées à la paroi latérale (11'), ont leurs extrémités libres pliées sous une certaine inclinaison, en direction de l'extrémité libre de la virole à ressorts (9) et vers l'intérieur, en direction des bras élastiques de contact (3).





