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(54) A flat connector socket.

(57) In a flat connector socket, there being provided a contact spring arm base having crimps, two contact spring arms disposed on the base, such 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, and an overspring which is securable by way of an overspring base to the contact spring arm base, extends outwards by way of parts disposed on the overspring base, adjacent the contact spring arms therefrom, engages by way of parts bent towards one another at the free ends, over the free ends of the contact spring arms and supports the socket in a chamber of a socket envelope, in order to protect the contact spring arms and to facilitate undisturbed use thereof in pivoting systems, the overspring base (10) and the overspring part (11) which extends adjacent the contact spring arms (3) are embodied by a peripherally closed socket member which, by way of bent parts (12) disposed on first side walls (11') extending adjacent the wide sides of the contact spring arms (3), engages over the free ends thereof and is formed with notches (15) in second side walls (11'') between the first side walls (11') having bent parts (12), into which notches (15) the end-face end of the first side walls (11') merges and which extend over some of their length towards the contact spring arm base (2).

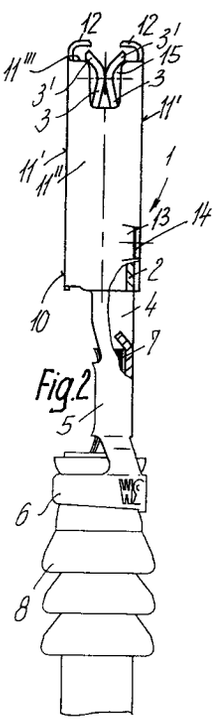

Fig.2

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The invention relates to a flat connector socket, there being provided a contact spring arm base having crimps, two contact spring arms disposed on the base, such 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, and an overspring which is securable by way of an overspring base to the contact spring arm base, extends outwards, by way of parts disposed on the overspring base, adjacent the contact spring arms at a spacing therefrom, , engages, by way of parts bent towards one another at the free ends, over the free ends of the contact spring arms and supports the socket in a chamber of a socket envelope.

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 altghough 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.

It is the object of the invention to provide in flat connector sockets of the kind hereinbefore set out features for protecting the contact spring arms without impairing satisfactory use of the connectors in pivoting systems.

According to the invention, therefore, the overspring base and the overspring part which extends adjacent the contact spring arms are embodied by a peripherally closed socket member which, by way of bent parts disposed on first side walls extending adjacent the wide sides of the contact spring arms, engages over the free ends thereof and is formed with notches in second side walls between the first side walls having bent parts, into which notches the end-face end of the first side walls merges and which extend over some of their length towards the contact spring arm base. Since the overspring is of closed construction over its whole length it serves as a protective jacket for the contact spring arms while the notches facilitate the use of the socket in pivoting systems by enabling the contact pins to be guidable unimpaired near the slots when being pivoted in and out.

According to a development of the flat connector socket, the base zone of the notches serves as abutment for support members fixedly disposed on the walls of the envelope chamber and support members disposed resiliently on the envelope, are engageable below that end of the overspring base or socket member and contact spring arm base which is remote from the notches. The notches therefore serve 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 introducible into the envelope and the socket can be locked.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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 flat connector socket, there being provided a contact spring arm base having crimps, two contact spring arms disposed on the base, such 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, and an overspring which is securable by way of an overspring base to the contact spring arm base, extends outwards, by way of parts disposed on the overspring base, adjacent the contact spring arms outwards therefrom, engages, by way of parts bent towards one another at the free ends, over the free ends of the contact spring arms and supports the socket in a chamber of a socket envelope, characterised in that the overspring base (10) and the overspring part (11) which extends adjacent the contact spring arms (3) are embodied by a peripherally closed socket member which, by way of bent parts (12) disposed on first side walls (11') extending adjacent the wide sides of the contact spring arms (3), engages over the free ends thereof and is formed with notches (15) in second side walls (11'') between the first side walls (11') having bent parts (12), into which notches (15) the end-face end of the first side walls (11') merges and which extend over some of their length towards the contact spring arm base (2).

2. A socket according to claim 1, characterised in that the base zone of the notches (15) serves as abutment for support members (20), for example, projections, fixedly disposed on the walls of the envelope chamber (18) and support members (21), for example, projections, disposed resiliently on the envelope (19), are engageable below that end of the overspring base or socket member (10, 11 respectively) and contact spring arm base (2) which is remote from the notches (15).

3. A socket according to claim 2, characterised in that the support members (21) are wedge-shaped and are fixedly disposed on support strips (22) deflectable by means of the overspring (9).

4. A socket 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.

5. A socket according to claim 4, characterised in that the resilient spring tongues (25) are rigidly secured by way of a side edge (11') to the first side walls (11') and have their free ends bent at an inclination to the free end of the overspring (9) and inwardly towards the contact spring arms (3) (Figs. 12, 13, 14, 16, 17, 18).

6. A socket according to claim 4, characterised in that the spring tongues (25) are rigidly secured by way of a side edge (11') to the first side walls (11') and have their free ends bent at an inclination to the overspring base (10) and inwardly towards the contact spring arms (3) (Figs. 20, 21, 22).

7. A socket according to claims 1, 4, 5 and 6, characterised in that impressions (24) or the like for the pivotal reception of the free ends (3') of the arms (3) are disposed in the first side walls (11') of the overspring part (11).

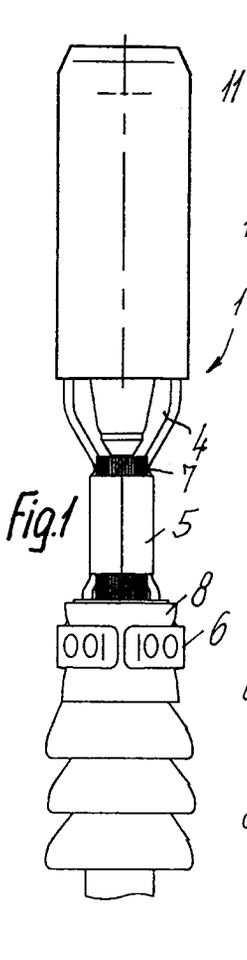


Fig.1

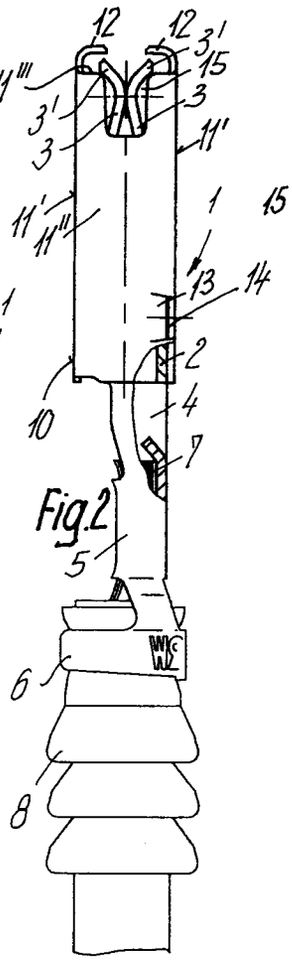


Fig.2

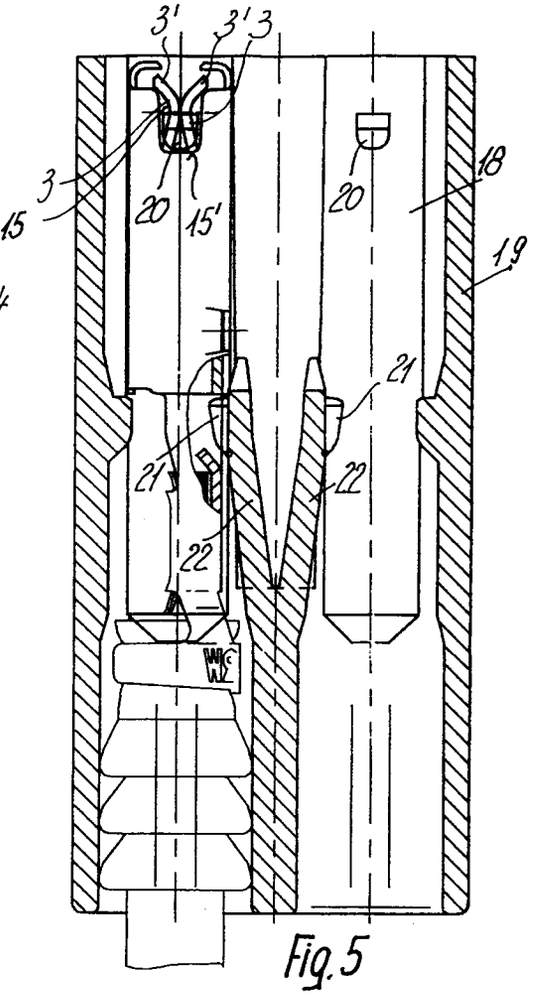


Fig.5

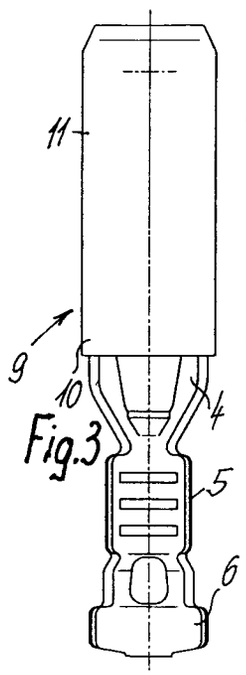


Fig.3

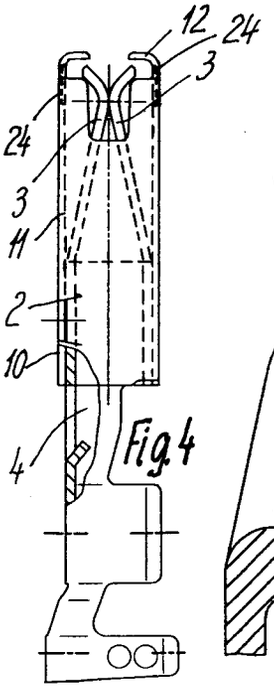


Fig.4

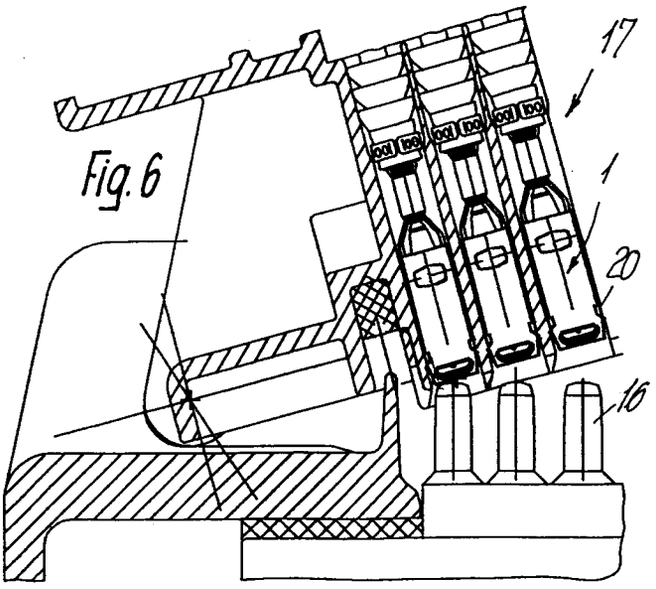


Fig.6

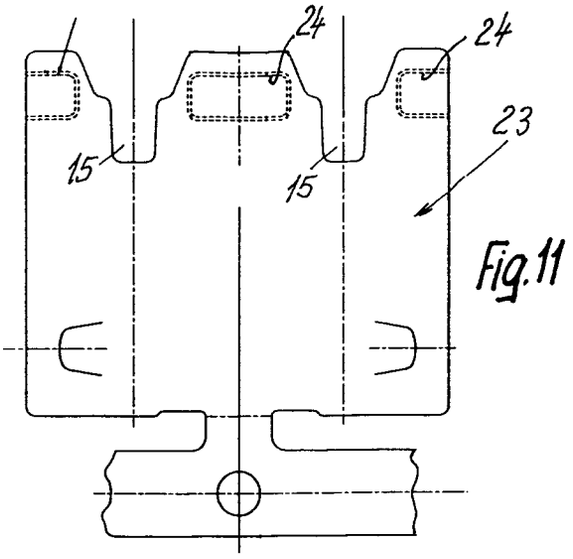


Fig.11

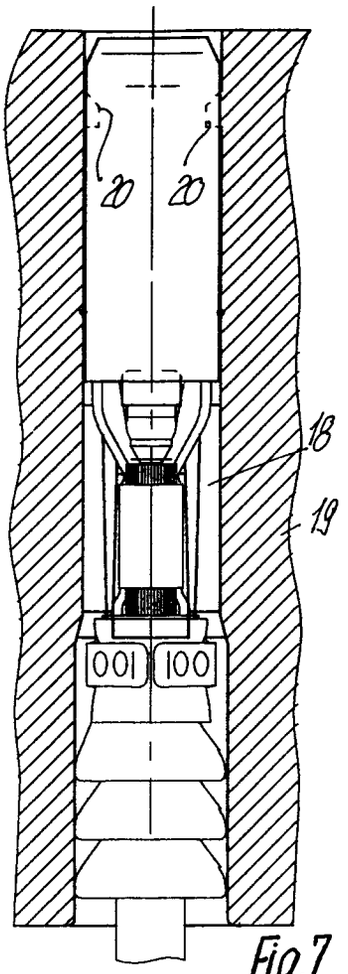
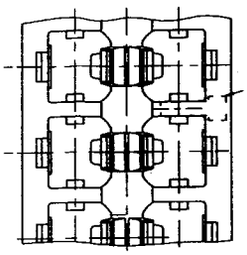


Fig.7

Fig.8



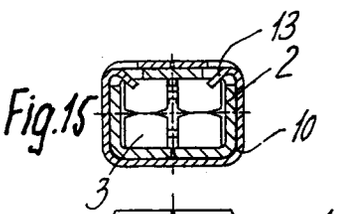


Fig.15

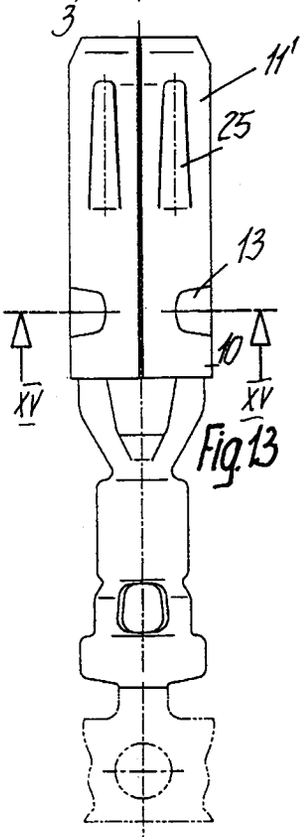


Fig.13

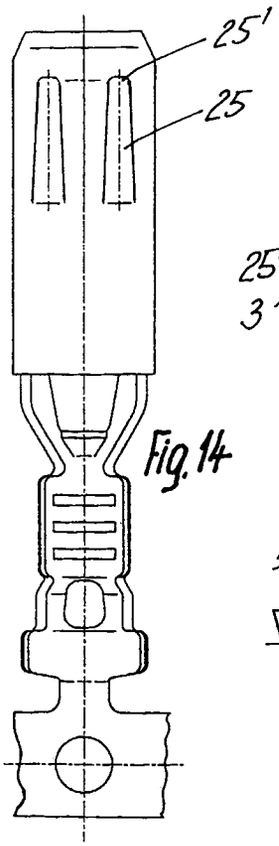


Fig.14

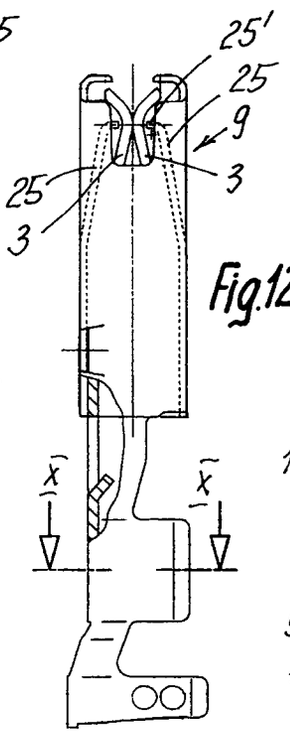


Fig.12

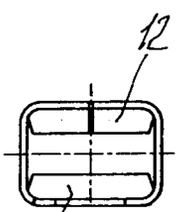


Fig.10

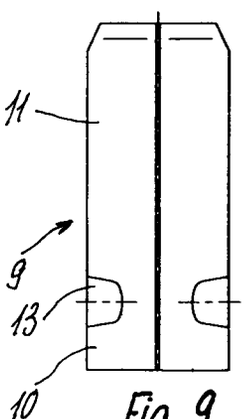


Fig.9

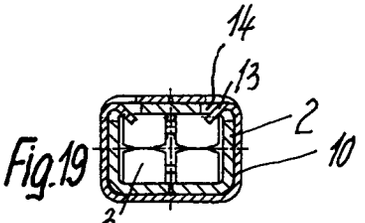


Fig.19

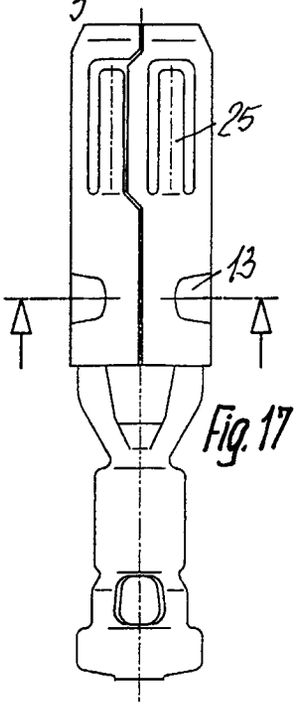


Fig.17

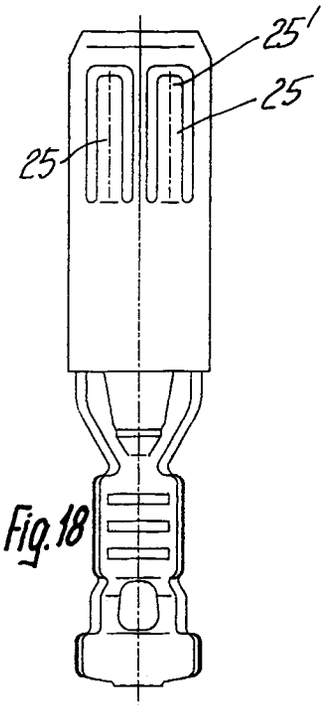


Fig.18

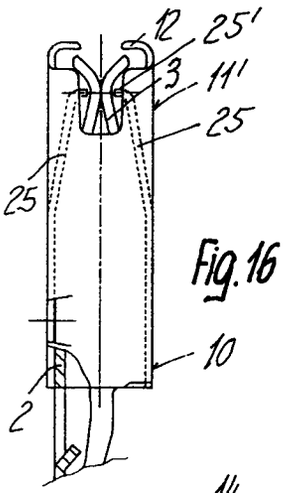


Fig.16

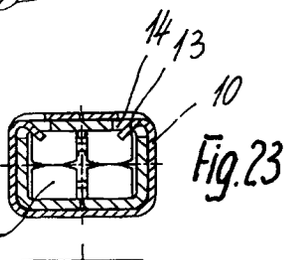


Fig.23

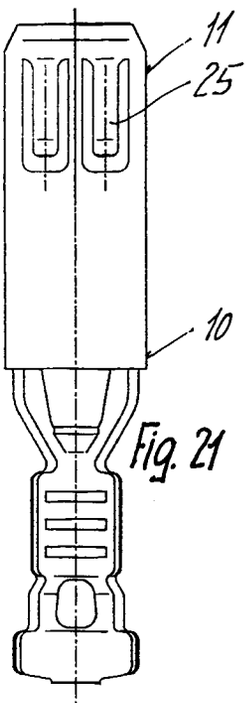


Fig. 21

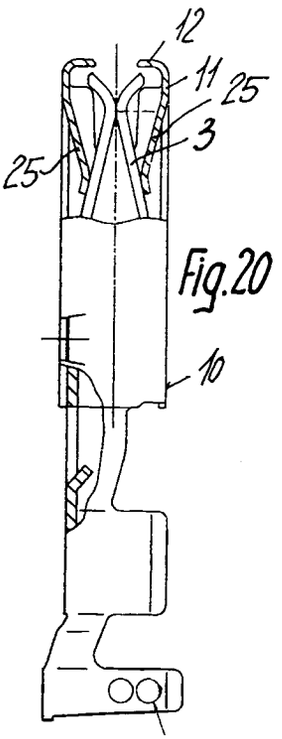


Fig.20

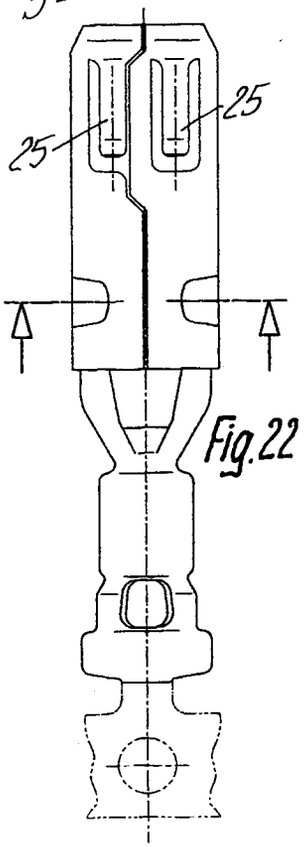


Fig.22