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⑰ **Connector with lock mechanism.**

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㉑ References cited:
DE-A-1 590 655
DE-A-2 063 258
DE-A-2 165 037
FR-A-1 355 766
FR-A-1 455 850
FR-A-1 525 556
FR-A-2 447 105

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Description

The present invention relates to a connector for electrically connecting the contacts of a plug and the contacts of a socket by coupling the plug and the socket with each other, and more particularly to a connector having a lock mechanism for locking the plug and the socket together when the plug is inserted in the socket.

One form of the connector of the type described is revealed in Japanese Laid-Open Utility Model Publication No. 53-110489. With the known connector, when a plug and a socket are coupled with each other, a lock mechanism is automatically actuated to lock the plug and the socket together. The plug and the socket are locked against separation even when a cord connected to the connector is caught by a hand or a foot, for example. To disengage the plug and the socket, a coupling sleeve disposed around the plug is pulled back against a biasing force for unlocking the plug and the socket. When coupling the conventional connector, however, it has not been possible to connect the plug and the socket while holding the coupling sleeve. Since the coupling sleeve takes up a relatively large area around the plug, the user is required to hold a relatively small portion such as a cap other than the coupling sleeve, and has to pay attention to do so.

A connector plug according to the prior art portion of claim 1 is disclosed in the document FR—A—2 447 105. In this prior art the locking spring means and the support bar means are together movable with respect to the plug body means and are further movable with respect to each other. With this prior art, when the connector plug has been plugged into the socket, it is necessary to manually push the support bar means towards the socket in order to achieve the locking state of the connection. This prior art substantially relies upon particular shapes of both movable pieces, the locking spring means and the support bar means. This known connector plug does not provide an automatic locking. Furthermore, this prior art suffers from the drawback mentioned before since during the connection of plug and socket care must be taken where to hold the plug in order not to interfere with the normal operation of the locking spring means and the support bar means.

The document FR—A—1455850 relates to a hose connector assembly, wherein, when two counterparts are being connected to each other, the free end of a locking spring provided on one part pushes back one end of a cylinder provided on the other part until a protrusion of the locking spring falls in a recess provided in the body of the other part. The cylinder is then pushed forward by a coil spring to confine the locking spring within the cylinder, thereby achieving an automatic locking. In order to disconnect the assembly, the cylinder is pulled backward to allow the locking spring to be displaced radially outward to disengage its protrusion from the said recess. In this prior art the locking spring is provided on one and

the cylinder on the other of the two counterparts of the assembly. The cylinder extends over a substantial length of the respective counterpart but it must not be held while both counterparts are plugged together. Thus, there is again the drawback that care must be taken where to hold the individual parts when they are plugged together.

Summary of the invention

It is an object of the present invention to provide a connector plug with a lock mechanism that can be coupled to a socket while holding wherever desired on the plug, and which is relatively simple in construction and can be manufactured inexpensively.

This object is achieved with a connector plug as claimed in claim 1.

Specific embodiments of the connector plug are claimed in dependent claims.

The socket to be used with said connector plug is claimed in an independent claim.

With the claimed solution, a locking spring means and a support bar means extending axially of the connector plug are disposed in superposed relation, and the support bar means is axially movable and normally urged forwardly under the resiliency of a coil spring. When the connector plug is to be inserted into a socket, the support bar means is caught by a front surface of the socket and the locking spring means is first inserted into an insertion slot defined in the front surface of the socket. As protrusions on the ends of locking springs of the locking spring means engage in recesses in the insertion slot in the socket, the support bar means is inserted into the insertion slot under the bias of the coil spring, whereupon the protrusions are retained in the recesses to lock plug and socket together. The connector plug can be pulled out of the socket by pulling back a coupling sleeve against the biasing force to withdraw the support bar means out of the insertion slot.

The above and other objects, features and advantages of the present invention will become more apparent from the following description when taken in conjunction with the accompanying drawings in which preferred embodiments of the present invention are shown by way of illustrative example.

Brief description of the drawings

Fig. 1 is a front elevational view of a plug in a connector according to the present invention;

Fig. 2 is a side elevational view of the plug shown in Fig. 1;

Fig. 3 is a cross-sectional view taken along line 3—3 of Fig. 1;

Fig. 4 is a perspective view of a plug body;

Fig. 5 is a perspective view of support bars;

Fig. 6 is a perspective view of a cap;

Fig. 7 is a perspective view of a half body of a coupling sleeve;

Fig. 8 is a front elevational view of a socket in the connector of the invention;

Fig. 9 is a cross-sectional view taken along line 9—9 of Fig. 8;

Figs. 10A through 10D are fragmentary cross-sectional views showing the relationship between a locking spring, a protrusion, a support bar, an insertion slot, and a recess at the time the plug is inserted into and removed from the socket;

Fig. 11 is a cross-sectional view of a plug according to another embodiment;

Fig. 12 is a cross-sectional view of a socket according to another embodiment;

Fig. 13 is a cross-sectional view of a plug according to still another embodiment;

Fig. 14 is an exploded perspective view of the plug shown in Fig. 13, with a coupling sleeve omitted from illustration;

Fig. 15 is a perspective view of the plug of Fig. 13, with the coupling sleeve removed; and

Fig. 16 is a perspective view of a cap of the plug of Fig. 13.

Description of the preferred embodiments

A plug in a connector according to an embodiment of the present invention is shown in Figs. 1 through 3. As shown in Fig. 3, a plug body 11 is in the form of a cylinder of an insulating material, and a tubular insert 12 is formed integrally with the plug body 11 and extends coaxially therewith toward a position in front of the plug body 11 (see Fig. 4). Plug contacts 13 project forwardly from the plug body 11 in the tubular insert 12. The plug contacts 13 comprises pin contacts force-fitted in and extending through small holes (not shown) defined axially through the plug body 11. The contacts 13 have rear ends to which are connected lead wires 14a from a cord 14. The plug body 11 is fitted at its rear end in a front end of a cap 15, with the cord 14 lead out of a rear end of the cap 15. As illustrated in Figs. 2 and 3, a positioning ridge 16 is integrally formed on an inner peripheral surface of the tubular insert 12 and extends axially thereof.

According to the present invention, locking springs 17 extending axially forwardly are mounted on the plug body 11 and have on free ends thereof protrusions 18 projecting radially outwardly of an axis of the plug body 11. The locking springs 17 are resiliently displaceable in radial directions. As shown in Figs. 1 and 4, U-shaped slots 19 are formed in the insert 12 to axially extend into the plug body 11 to define the locking springs 17. The locking springs 17 have rear ends integrally fixed to the plug body 11 and free front ends from which the protrusions 18 integrally project. In the illustrated embodiment, the locking springs 17 are disposed in diametrically opposite relation to each other.

As illustrated in Fig. 3, a pair of support bars 21 is held against surfaces of the locking springs 17 opposite from the protrusions 18 and is axially movable. The support bars 21 are normally urged by a coil spring 22 to move axially in a forward direction, and can be moved back by a coupling sleeve 23 against the resiliency of the coil spring 22. The coupling sleeve 23 is axially movably

disposed around the plug body 11 and the cap 15. As shown in Fig. 5, the support bars 21 have rear ends integrally connected by a ring member 24 on which there is integrally formed a pair of engagement members 25 extending radially outwardly.

As illustrated in Figs. 2, 3 and 6, the cap 15 has axial guide slots 26 defined in a front portion thereof in radial alignment with the engagement members 25. The engagement members 25 are guided in the axial guide slots 26 for axial movement therealong, with the engagement members 25 projecting radially outwardly from the guide slots 26. As shown in Fig. 4, the plug body 11 has axial holes 27 positioned radially inwardly of the locking springs 17 and having substantially the same widths as those of the U-shaped slots 19, the axial holes 27 communicating with the slots 19 and the interior of the tubular insert 12. As shown in Fig. 3, the support bars 21 are inserted in the holes 27 and held substantially in contact with inner surfaces of the locking springs 17. The support bars 21 have inner surfaces lying flush with or slightly recessed from the inner peripheral surface of the insert 12. As shown in Figs. 3 and 7, the coupling sleeve 23 has a ring-shaped recess 28 defined in an inner peripheral surface thereof in which ends of the engagement members 25 are inserted so as to be axially movable. The coupling sleeve 23 also has locking teeth 29 projecting radially inwardly from the inner peripheral surface of the coupling sleeve 23 at a rear end thereof. Between the locking teeth 29 and the ring-shaped recess 28, there is positioned a ring-shaped stopper 31 (Fig. 6) integrally formed on an outer peripheral surface of the cap 15. That is, a portion of the coupling sleeve 23 which is rearward of the ring-shaped recess 28 has a greater inside diameter to define a ring-shaped clearance 32 for allowing the coupling sleeve 23 to be axially moved between the locking teeth 29 and the ring-shaped recess 28.

The coil spring 22 is interposed between a ring-shaped step 20 formed in an inner peripheral surface of the cap 15 and the engagement members 25 in coaxial relation to the cap 15. The coil spring 22 urges the support bars 21 in a forward direction, and also urges the engagement members 25 to engage a front wall surface 28a of the ring-shaped recess 28 to thereby bias the coupling sleeve 23 forwardly. Under this condition, the locking teeth 29 are in engagement with the stopper 31.

In the illustrated position, the protrusions 18 of the locking springs 17 are positioned forwardly of the coupling sleeve 23 and project radially outwardly beyond the outer peripheral surface of the insert 12. The locking springs 17 project slightly forwardly of the support bars 21.

A socket for use with the plug shown in Figs. 1 through 7 is illustrated by way of example in Figs. 8 and 9. A socket body 34 is in the form of a cylinder made of an insulating material and has a ring-shaped insertion slot 35 defined in a front surface thereof. Contacts 36 are mounted in the socket body 34 radially inwardly of the slot 35.

The socket contacts 36 are capable of coupling engagement with the plug contacts 13. In the illustrated embodiment, the socket contacts 36 are in the form of receptacle contacts in which the pin contacts 13 can be inserted. The socket contacts 36 are force-fitted in holes defined in the socket body 34. The socket body 34 includes an axial positioning groove 37 defined in an inner peripheral surface of the insertion slot 35 for receiving the positioning ridge 16 in the plug (Figs. 2 and 3).

The socket body 34 also includes locking recesses 38 defined in an outer peripheral surface of the insertion slot 35 for receiving the protrusions 18 of the locking springs 17. In Fig. 3, the sum d_1 of the thicknesses of the protrusion 18 and the locking spring 17 and the thickness of the support bar 21 is greater than the width d_2 (Fig. 9) of the insertion slot 35. The width d_2 of the insertion slot 35 is greater than the sum d_3 of the thickness of the locking spring 17 behind the protrusion 18 and the thickness of the support bar 21. The axial length of the ring-shaped clearance 32 is selected such that, with the protrusions 18 engaging in the recesses 38, the support bars 21 can move into and out of the insertion slot 35 or be axially displaced.

Each of the protrusions 18 has a front taper 18a (Fig. 10A) sloping down from the top of the protrusion towards the tip end of the locking spring 17 to submerge under the level of the outer peripheral surface of the tubular insert 12 so that when the tubular insert 12 is inserted into the insertion slot 35, an outer edge of the slot 35 abuts the front taper 18a to displace the free end portion of the locking spring 17 radially inwardly.

Instead of providing the front taper 18a at the front end of the protrusion 18, it is also possible to form a taper 35a at the outer edge of the insertion slot 35 as indicated by broken line in Fig. 10C. In this case, the front end of the protrusion 18 is right-angled as indicated by broken line 18'.

The protrusion 18 may also have a rear taper 18b at the rear end thereof, which effects to press the locking spring 17 radially inwardly as the locking spring 17 is pulled out of the insertion slot 35 (Fig. 10D). Instead of providing the rear taper 18b at the rear end of the protrusion 18, it is also possible to form a taper at an inner edge of the insertion slot 35, though not shown in the drawings.

For coupling the plug and the socket, the tubular insert 12 of the plug is inserted into the insertion slot 35 in the socket. When a front portion of the insert 12 extending forward beyond the free end of the locking spring 17 is inserted into the insertion slot 35, relative positioning between the insertion slot 35 and the free end of the locking spring 17 is automatically accomplished so that the outer edge of the insertion slot 35 may abut the front taper 18a of the protrusion 18. Accordingly, the ends of the protrusions 18 are guided into the insertion slot 35 as shown in Fig. 10A. Since the thickness d_1 of the protrusion 18 and the support bar 21 is greater than the slot

width d_2 , as described above, the support bar 21 engages the front surface of the socket body 34 as shown in Fig. 10B and is retracted relatively to the protrusion 18 against the resiliency of the coil spring 22. The protrusions 18 and the insert 12 enter the insertion slot 35 while causing the locking springs 17 to be resiliently bent radially inwardly. When the protrusions 18 are brought into confronting relation to the recesses 38, the protrusions 18 enter and engage axially in the recesses 38 since the locking springs 17 spring back. At the time the locking springs 17 are resiliently bent, the support bars 21 are also resiliently bent as shown in Fig. 10B. Upon entrance of the protrusions 18 into the recesses 38, the support bars 21 spring back and are inserted into the insertion slot 35 under the force of the coil spring 22. To facilitate easy insertion of the support bars 21 into the insertion slot 35, it is preferable for each support bar 21 to have a tapered surface 21a on the distal end thereof. With the plug and the socket thus coupled, they are securely locked and cannot be separated merely by pulling the plug in a direction out of the socket since the protrusions 18 cannot be pulled out of the recesses 38 as the thickness of the locking spring 17 and the support bar 21 and the insertion slot width d_2 are selected as described above.

To pull the plug out of the socket, the coupling sleeve 23 is pulled back against the biasing force of the coil spring 22. The support bars 21 are then pulled back through the engagement members 25 until the support bars 21 are brought out of the insertion slot 35 as shown in Fig. 10D. Therefore, the ends of the locking springs 17 can be moved in a direction opposite from the protrusions 18. By pulling the plug axially, the locking springs 17 are resiliently bent as the protrusions 18 are moved out of the recesses 38, whereupon the plug is unlocked from the socket.

With the connector of the invention being thus constructed, when the plug is to be inserted into the socket while holding the coupling sleeve 23, the force imposed on the coupling sleeve 23 is applied through the locking teeth 29 to the cap 15. Thus, the plug can be inserted into the socket. The plug can also be inserted into the socket while holding wherever desired on the cap 15. The plug can easily be assembled by attaching the contacts 13 to the plug body 11, inserting the support bars 21 through the holes 27 from behind the plug body 11, connecting the cord 14 to the contacts 13, fitting the plug body 11 into the cap 15 with the coil spring 22 housed therein, and then mounting the coupling sleeve 23 onto the plug body 11 and the cap 15 from the front ends thereof. The plug can be constructed of relatively simple parts with ease. Although the locking springs 17 are shown as integral with the plug body 11, the locking springs 17 may be integrally formed with the cap 15. The locking springs 17 may be positioned radially inwardly of the support bars 21, with the protrusions 18 disposed radially inwardly, and the recesses 38 defined in

the inner peripheral surface of the insertion slot 35. As shown in Figs. 11 and 12 in which like parts are denoted by like reference characters in Figs. 1 through 9, the plug contacts 13 in the plug body 11 may comprise receptacle contacts, and the socket contacts 36 in the socket body 34 may comprise pin contacts. The locking spring 17 and the support bar 21 may be combined in one pair or three or more pairs.

Figs. 13 through 16 illustrate a plug in a connector according to another embodiment of the present invention. Like or corresponding parts in Figs. 13 through 16 are designated by like or corresponding reference characters in Figs. 1 through 9. The plug body 11 is fixed to the cap 15 by auxiliary members. More specifically, the plug body 11 includes an extension 11a projecting rearwardly of the proximal ends of the locking springs 17, and such a rearward extension 11a has an outside diameter smaller than that of the plug body 11, thus defining a ring-shaped step 41. A ring member 24 is disposed over the rearward extension 11a, and a coil spring 22 is also disposed over the rearward extension 11a. The locking springs 17 project radially outwardly of the outer peripheral surface of the plug body 11, and have integral positioning projections 42, 43 projecting away from each other on the proximal ends of the locking springs 17. An edge of the tubular insert 12 comprises projections 44 projecting radially outwardly from the outer peripheral surface of the tubular insert 12.

Semicylindrical metal members 45, 46 serve as auxiliary members for fixing the plug body 11 to the cap 15, and are mounted on the plug body 11 in surrounding relation to the outer peripheral surface thereof. Each of the semicylindrical metal members 45, 46 has an opening 47 radially aligned with the locking spring 17, recesses 48, 49 communicating with the opening 47 and aligned with the positioning projections 42, 43, and a recess 51 aligned with the projection 44. The projections 42, 43, 44 are fitted respectively in the recesses 48, 49, 51 to position the metal members 45, 46 on the plug body 11. The metal members 45, 46 extend rearwardly of the plug body 11, and one of the metal members 45 includes an arm 52 extending rearwardly. The rearwardly extending arm 52 is inserted into the cap 15 along an inner surface thereof. The arm 52 has a threaded hole 53. A screw 55 extends through a small hole 54 in the cap 15 threaded into the threaded hole 53, thus fastening the metal member 45 to the cap 15.

The cap 15 has two pairs of recesses 56 defined in diametrically opposite front portions thereof. Between the recesses 56 of each pair is formed a tongue in which there is defined a rectangular hole, the tongue with the rectangular hole serving as a holder 57. Thus, there are two such holders 57 on the cap 15 in diametrically opposite relation to each other. As shown in Fig. 16, each of the holders 57 is a double-walled construction having an arcuate groove 58 therein. The rear ends of the metal members 45, 46 are fitted into the arcuate grooves 58, respectively. The coil spring 22 is

pushed forwardly by a front end surface of the cap 15. The arm 52 has an end serving as a cross-sectionally U-shaped lead-wire holder 59 which holds a plurality of lead wires 14a connected to plug contacts, so that no strong forces will be applied to joints between the lead wires 14a and the contacts when the cord 14 is strongly pulled. The coupling sleeve 23 has on an inner surface thereof projections 61 in the shape of a right-angled triangle. When the front end of the cap 15 is inserted into the coupling sleeve 23, the holders 57 are first elastically deformed radially inwardly and then the projections 61 are snapped into the rectangular holes in the holders 57. Therefore, the coupling sleeve 23 is axially movably mounted on the cap 15.

Claims

1. A connector plug comprising:
 - a plug body means having a plug body (11) of an insulating material with at least one contact (13) mounted therein;
 - locking spring means (17) supported on said plug body means and projecting forwardly thereof, said locking means (17) having on a front end thereof a protrusion (18) projecting radially with respect to an axis of said plug body means,
 - said locking spring means (17) being resiliently displaceable in a direction opposite to the direction in which said protrusion (18) projects;
 - support bar means (21) held against said locking spring means (17) on a side opposite from said protrusion (18) and axially movable;
 - an engagement member means (25) connected to a rear end of said support bar means (21), said engagement member means (25) being axially movable; characterized in that
 - said plug body means further comprises a tubular body (12) having said plug body (11) disposed radially inside thereof and fixed thereto,
 - said locking spring means (17) being fixed at a rear end thereof to said plug body means;
 - said connector plug further comprising:
 - a cap (15) mounted on a rear portion of said plug body means;
 - a coupling sleeve (23) disposed coaxially around said plug body means so as to be axially movable relative thereto, said engagement member means (25) being axially engageable with said coupling sleeve (23); and
 - a coil spring (22) for normally urging said engagement member means (25) and said coupling sleeve (23) in a forward direction.
2. A connector plug according to claim 1, wherein a front end of said tubular body (12) is projected axially beyond said coupling sleeve (23).
3. A connector plug according to claim 1, wherein said locking spring means (17) comprises a pair of locking springs disposed in diametrically opposite relation to each other with respect to the axis of said plug body means, and said support bar means (21) comprises a pair of support bars disposed in slidable relation to respective said pair of locking springs.

4. A connector plug according to claim 3, wherein said pair of support bars (21) have rear ends integrally connected to a ring member (24).

5. A connector plug according to claim 1, wherein said locking spring means (17) is integrally formed with said plug body (11).

6. A connector plug according to claim 1, wherein said locking spring means (17) is defined by a U-shaped slot formed in said tubular body (12).

7. A connector plug according to claim 1, wherein said plug body (11) has formed therein a through hole (27) extending in axial direction to axially align with said locking spring means (17), said support bar means (21) being slidably inserted in said through hole.

8. A connector plug according to claim 1, wherein said engagement member means (25) projects radially outwardly to be located axially behind a rear surface (28a) of an axial step formed on an inner surface of said coupling sleeve (23), said engagement member means (25) and said coupling sleeve (23) being engageable with each other when said coupling sleeve moves relative to said engagement member means in a rearward direction.

9. A connector plug according to claim 1, wherein a rear end of said tubular body (12) is extending axially rearwardly beyond a rear end face of said plug body (11) to define a rear space, said coil spring (22) being disposed in said rear space axially behind said engagement member means (25).

10. A connector plug according to claim 1, wherein said coil spring (22) is disposed around said plug body means axially behind said engagement member means (25).

11. A connector plug according to claim 10, including a cylindrical member means (45, 46) disposed around said plug body means, a rear portion of said cylindrical member means extending rearwardly beyond a rear end of said plug body means and fitted into said cap (15), whereby said cap is mounted in said plug body means via said cylindrical member means.

12. A connector plug according to claim 11, wherein said cylindrical member means (45, 46) is composed of a pair of semicylindrical members.

13. Socket for use with a connector plug according to any of the preceding claims, characterised in that said socket comprises a socket body (34) of an insulating material, at least one socket contact (36) mounted on said socket body (34) and electrically connectable to said plug contact (13), said socket body (34) having an insertion slot (35) defined in a front surface thereof for receiving said locking spring means (17) and said support bar means (21), said insertion slot (35) having a height smaller than the sum of the thickness of said locking spring means (17) including said protrusion (18) and the thickness of said support bar means (21), and larger than the sum of the thickness of said locking spring means (17) other than said protrusion and the thickness of said support bar means (21), and said socket body

having a recess (38) defined in said insertion slot (35) and axially engageable with said protrusion (18) when said locking spring means (17) and said support bar means (21) are inserted into said insertion slot (35).

Patentansprüche

1. Verbindungsstecker umfassend:

eine Steckerkörperanordnung mit einem Steckerkörper (11) aus einem isolierenden Material, in dem wenigstens ein Kontakt (13) montiert ist,

eine Verriegelungsfederanordnung (17), die auf der Steckerkörperanordnung gehalten wird und von dieser nach vorn vorsteht, die an einem vorderen Ende einen sich in bezug auf eine Achse der Steckerkörperanordnung radial erstreckenden Vorsprung (18) aufweist und die in einer Richtung entgegengesetzt zur Richtung, in welcher sich der Vorsprung (18) erstreckt, elastisch verstellbar ist,

eine Trägerstangenanordnung (21), die auf einer dem Vorsprung (18) entgegengesetzten Seite gegen die Verriegelungsfederanordnung (17) gehalten wird und axial beweglich ist,

eine Eingriffsteilanordnung (25), die mit dem hinteren Ende der Trägerstangenanordnung (21) verbunden ist und axial beweglich ist, dadurch gekennzeichnet,

daß die Steckerkörperanordnung ferner einen rohrförmigen Körper (12) aufweist, radial innerhalb dessen sich der Steckerkörper (11) befindet und daran befestigt ist, wobei die Verriegelungsfederanordnung (17) an ihrem hinteren Ende an der Steckerkörperanordnung befestigt ist, und

daß der Verbindungsstecker ferner umfaßt: eine Kappe (15), die auf einen hinteren Teil der Steckerkörperanordnung montiert ist,

eine Kupplungshülse (23), die coaxial um die Steckerkörperanordnung angeordnet ist, so daß sie relativ zu dieser axial beweglich ist, wobei die Eingriffsteilanordnung (25) axial mit der Kupplungshülse (23) in Eingriff bringbar ist, und

eine Schraubenfeder (22), durch die die Eingriffsteilanordnung (25) und die Kupplungshülse (23) normalerweise in eine Vorwärtsrichtung gedrückt werden.

2. Verbindungsstecker nach Anspruch 1, bei dem ein vorderes Ende des rohrförmigen Körpers (12) axial über die Kupplungshülse (23) hinaus vorragt.

3. Verbindungsstecker nach Anspruch 1, bei dem die Verriegelungsfederanordnung (17) ein Paar von Verriegelungsfedern umfaßt, die einander in bezug auf die Achse der Steckerkörperanordnung diametral gegenüberliegend angeordnet sind, und bei dem die Trägerstangenanordnung (21) ein Paar von Trägerstangen umfaßt, die relativ verschiebbar zu einer jeweiligen der Verriegelungsfedern angeordnet sind.

4. Verbindungsstecker nach Anspruch 3, bei dem das Paar von Trägerstangen (21) einstückig mit einem Ringelement (24) verbundene hintere Enden aufweist.

5. Verbindungsstecker nach Anspruch 1, bei dem die Verriegelungsfederanordnung (17) ein-

stückig mit dem Steckerkörper (11) ausgebildet ist.

6. Verbindungsstecker nach Anspruch 1, bei dem die Verriegelungsfederanordnung (17) durch einen U-förmigen Schlitz in dem rohrförmigen Körper (12) gebildet ist.

7. Verbindungsstecker nach Anspruch 1, bei dem in dem Steckerkörper (11) in Durchgangsloch (27) ausgebildet ist, das sich in Axialrichtung erstreckt und axial mit der Verriegelungsfederanordnung (17) ausgerichtet ist, wobei die Trägerstangenanordnung (21) verschiebbar in das Durchgangsloch eingesteckt ist.

8. Verbindungsstecker nach Anspruch 1, bei dem die Eingriffsteilanordnung (25) radial nach außen vorsteht, um axial hinter einer hinteren Fläche (28a) einer axialen Stufe zu liegen, die an einer Innenfläche der Kupplungshülse (23) ausgebildet ist, wobei die Eingriffsteilanordnung (25) und die Kupplungshülse (23) miteinander in Eingriff bringbar sind, wenn die Kupplungshülse sich relativ zu der Eingriffsteilanordnung in Rückwärtsrichtung bewegt.

9. Verbindungsstecker nach Anspruch 1, bei dem ein hinteres Ende des rohrförmigen Körpers (12) sich axial nach hinten über eine hintere Stirnfläche des Steckerkörpers (11) hinaus erstreckt und einen hinteren Raum bildet, in welchem sich die Schraubenfeder (22) hinter der Eingriffsteilanordnung (25) befindet.

10. Verbindungsstecker nach Anspruch 1, bei dem die Schraubenfeder (22) um die Steckerkörperanordnung herum axial hinter der Eingriffsteilanordnung (25) angeordnet ist.

11. Verbindungsstecker nach Anspruch 10, umfassend eine Zylinderteilanordnung (45, 46), die um die Steckerkörperanordnung herum angeordnet ist, wobei sich ein hinterer Teil der Zylinderteilanordnung nach hinten über ein hinteres Ende der Steckerkörperanordnung hinaus erstreckt und in die Kappe (15) paßt, wodurch die Kappe über die Zylinderteilanordnung an der Steckerkörperanordnung befestigt wird.

12. Verbindungsstecker nach Anspruch 11, bei dem sich die Zylinderteilanordnung (45, 46) aus einem Paar halbzyklindrischer Teile zusammensetzt.

13. Buchse zur Verwendung mit einem Verbindungsstecker nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Buchse umfaßt:

einen Buchsenkörper (34) aus einem isolierenden Material, wenigstens einen an dem Buchsenkörper (34) befestigten und elektrisch mit dem Steckerkontakt (13) verbindbaren Buchsenkontakt (36), wobei der Buchsenkörper (34) einen Einführungsschlitz (35) aufweist, der in seiner Vorderfläche zur Aufnahme der Verriegelungsfederanordnung (17) und der Trägerstangenanordnung (21) ausgebildet ist und eine Höhe aufweist, die geringer als die Summe der Dicke der Verriegelungsfederanordnung (17) einschließlich des Vorsprungs (18) und der Dicke der Trägerstangenanordnung (21) ist und größer ist als die Summe der Dicke der Verriegelungsfederanord-

nung (17) mit Ausnahme des Vorsprungs und der Dicke der Trägerstangenanordnung (21), und wobei der Buchsenkörper eine in dem Einführungsschlitz (35) ausgebildete Ausnehmung (38) aufweist, die axial mit dem Vorsprung (18) in Eingriff bringbar ist, wenn die Verriegelungsfederanordnung (17) und die Trägerstangenanordnung (21) in den Einführungsschlitz (35) eingeführt werden.

Revendications

1. Fiche de connecteur comprenant:

un dispositif de corps de fiche comportant un corps de fiche (11) en matériau isolant dans lequel est monté au moins un contact (13);

un dispositif de ressorts de verrouillage (17) supporté sur ledit dispositif de corps de fiche et dépassant vers l'avant de celui-ci, ledit dispositif de verrouillage (17) présentant sur son extrémité avant une protubérance (18) dépassant radialement par rapport à l'axe dudit dispositif de corps de fiche, ledit dispositif de ressorts de verrouillage (17) étant déplaçable élastiquement dans un sens opposé à celui dans lequel ladite protubérance (18) fait saillie;

un dispositif de barrettes de support (21) maintenu contre ledit dispositif de ressorts de verrouillage (17) du côté opposé à ladite protubérance (18) et mobile axialement;

un dispositif d'éléments d'appui (25) relié à l'extrémité arrière dudit dispositif de barrettes de support (21), ledit dispositif d'éléments d'appui (25) étant mobile axialement; caractérisé en ce que:

ledit dispositif de corps de fiche comprend encore un corps tubulaire (12) dans l'intérieur duquel ledit corps de fiche (11) disposé radialement lui est fixé, ledit dispositif de ressorts de verrouillage (17) étant fixé par son extrémité audit dispositif de corps de fiche;

ladite fiche de connecteur comprenant encore: un chapeau (15) monté sur un tronçon arrière dudit dispositif de corps de fiche;

un manchon d'accouplement (23) disposé coaxialement autour dudit dispositif de corps de fiche de façon à être mobile axialement par rapport à lui, ledit dispositif d'éléments d'appui (25) pouvant venir axialement porter contre ledit manchon d'accouplement (23); et

un ressort à boudin (22) propre à solliciter normalement ledit dispositif d'éléments d'appui (25) et ledit manchon d'accouplement (23) vers l'avant.

2. Fiche de connecteur selon la revendication 1 dans laquelle l'extrémité avant dudit corps tubulaire (12) dépasse axialement au-delà dudit manchon d'accouplement (23).

3. Fiche de connecteur selon la revendication 1, dans laquelle ledit dispositif de ressorts de verrouillage (17) comprend une paire de ressorts de verrouillage diamétralement opposés l'un à l'autre par rapport à l'axe dudit dispositif de corps de fiche, et ledit dispositif de barrettes de support (21) comprend une paire de barrettes de

support pouvant coulisser chacune par rapport à l'un des deux susdits ressorts de verrouillage.

4. Fiche de connecteur selon la revendication 3, dans laquelle les deux susdites barrettes de support (21) présentent des extrémités arrière solidarisées d'un élément annulaire (24).

5. Fiche de connecteur selon la revendication 1, dans laquelle ledit dispositif de ressorts de verrouillage (17) est façonné d'un seul tenant avec ledit corps de fiche (11).

6. Fiche de connecteur selon la revendication 1, dans laquelle ledit dispositif de ressorts de verrouillage (17) est défini par une fente en U ménagée dans ledit corps tubulaire (12).

7. Fiche de connecteur selon la revendication 1, dans laquelle ledit corps de fiche (11) présente un trou traversant (27) s'étendant axialement pour se situer axialement en regard dudit dispositif de ressorts de verrouillage (17), ledit dispositif de barrettes de support (21) étant inséré à coulissement dans ledit trou traversant.

8. Fiche de connecteur selon la revendication 1, dans laquelle ledit dispositif d'éléments d'appui (25) dépasse radialement vers l'extérieur pour se situer axialement derrière la surface arrière (28a) d'un gradin axial façonné sur la surface intérieure dudit manchon d'accouplement (23), ledit dispositif d'éléments d'appui (25) et ledit manchon d'accouplement (23) pouvant se recontrer l'un l'autre quand ledit manchon d'accouplement se déplace vers l'arrière par rapport audit dispositif d'éléments d'appui.

9. Fiche de connecteur selon la revendication 1, dans laquelle l'extrémité arrière dudit corps tubulaire (12) dépasse axialement vers l'arrière au-delà de la face d'extrémité arrière dudit corps de fiche (11) pour définir un espace arrière, ledit ressort à boudin (22) étant disposé dans ledit espace arrière axialement derrière ledit dispositif d'éléments d'appui (25).

10. Fiche de connecteur selon la revendication 1, dans laquelle ledit ressort à boudin (22) est disposé autour dudit dispositif de corps de fiche

axialement derrière ledit dispositif d'éléments d'appui (25).

11. Fiche de connecteur selon la revendication 10, comportant un dispositif d'éléments cylindriques (45, 46) disposé autour dudit dispositif de corps de fiche, le tronçon arrière dudit dispositif d'éléments cylindriques dépassant vers l'arrière au-delà de l'extrémité arrière dudit dispositif de corps de fiche et étant inséré dans ledit chapeau (15), de sorte que ledit chapeau est monté dans ledit dispositif de corps de fiche par l'intermédiaire dudit dispositif d'éléments cylindriques.

12. Fiche de connecteur selon la revendication 11, dans laquelle ledit dispositif d'éléments cylindriques (45, 46) est composé de deux éléments semi-cylindriques.

13. Douille pour utilisation avec une fiche de connecteur suivant l'une quelconque des revendications précédentes, caractérisée en ce que ladite douille comprend un corps de douille (34) en matériau isolant, au moins un contact de douille (36) monté sur ledit corps de douille (34) et pouvant être relié électriquement audit contact de fiche (13), ledit corps de douille (34) présentant une fente d'insertion (35) définie dans sa surface avant pour recevoir ledit dispositif de ressorts de verrouillage (17) et ledit dispositif de barrettes de support (21), ladite fente d'insertion (35) ayant une hauteur inférieure à la somme de l'épaisseur dudit dispositif de ressorts de verrouillage (17) y compris ladite protubérance (18) et de l'épaisseur dudit dispositif de barrettes de support (21) et supérieure à la somme de l'épaisseur dudit dispositif de ressorts de verrouillage (17) en dehors de ladite protubérance et de l'épaisseur dudit dispositif de barrettes de support (21), ledit corps de douille présentant un évidement (38) défini dans ladite fente d'insertion (35) et pouvant venir axialement rencontrer ladite protubérance (18) quand ledit dispositif de ressorts de verrouillage (17) et ledit dispositif de barrettes de support (21) sont insérés dans ladite fente d'insertion (35).

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FIG. 1

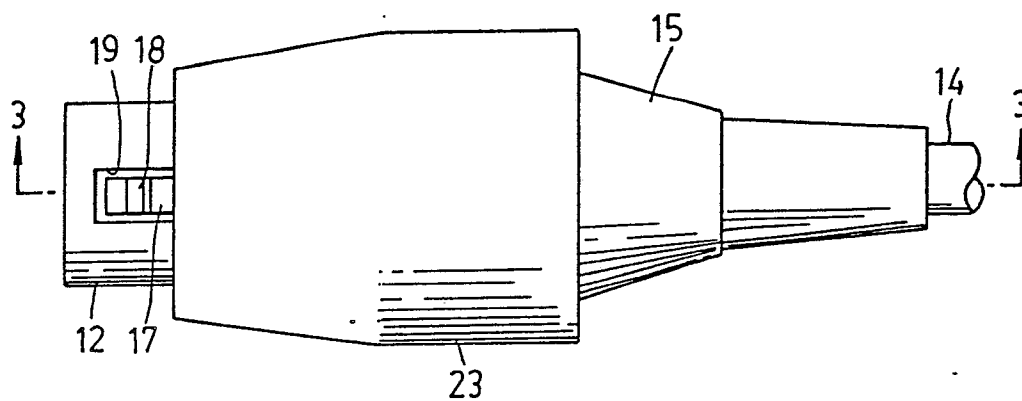


FIG. 2

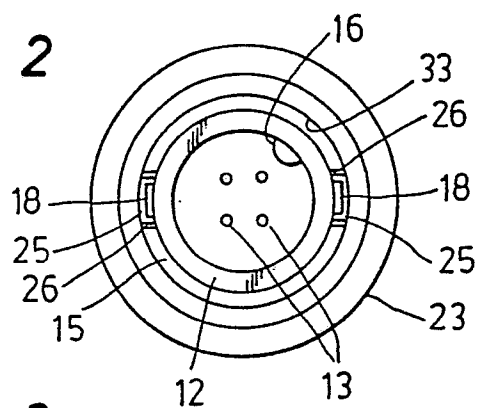


FIG. 3

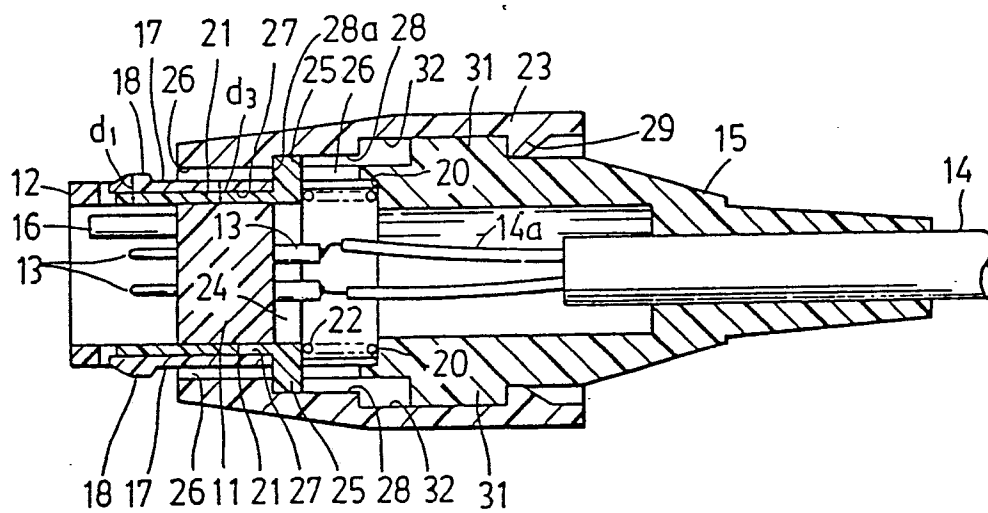


FIG. 4

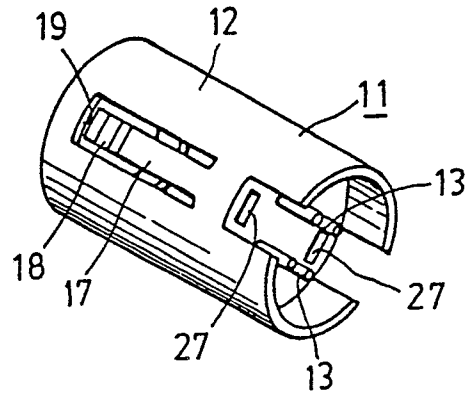


FIG. 5

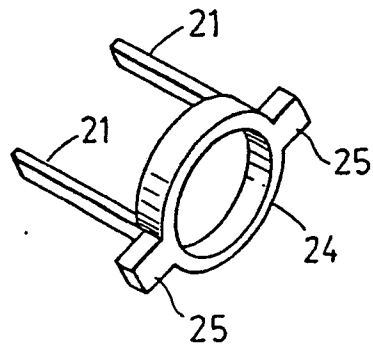


FIG. 6

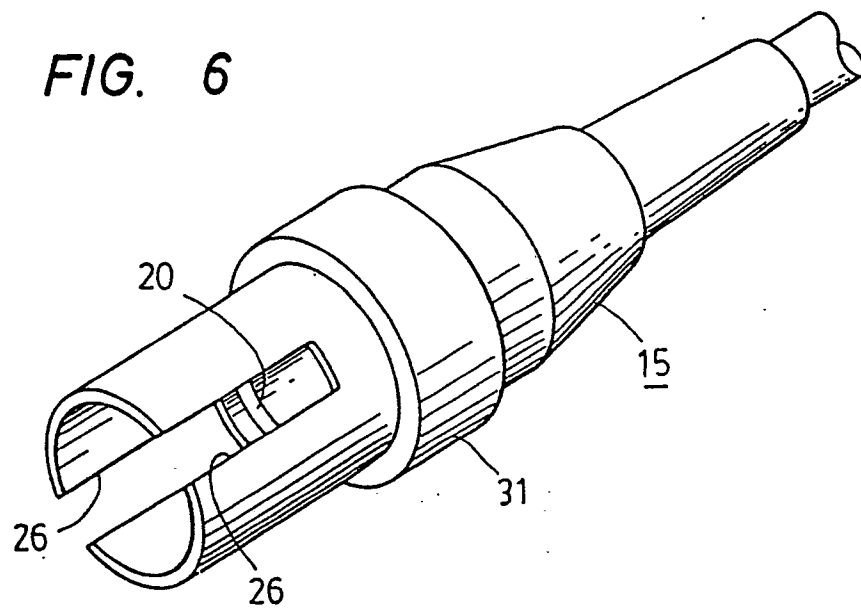


FIG. 7

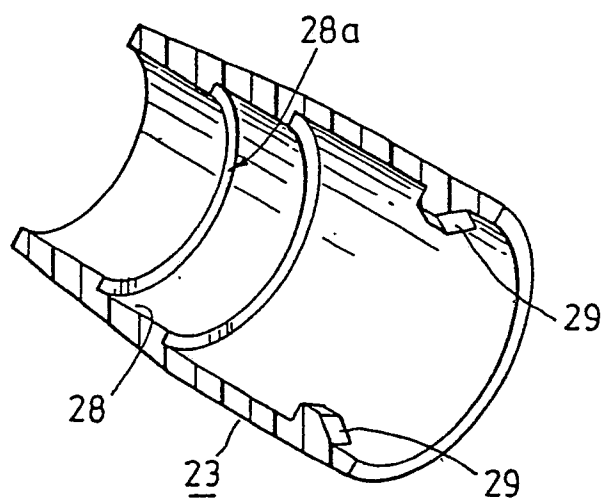


FIG. 8

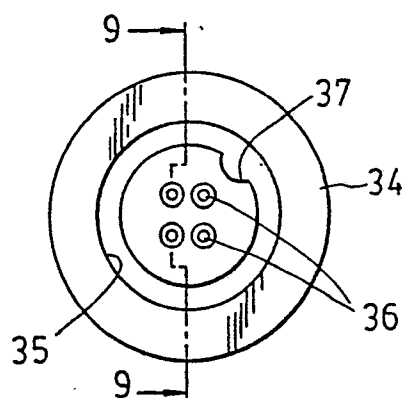
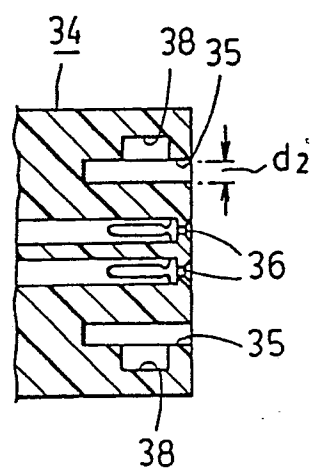


FIG. 9



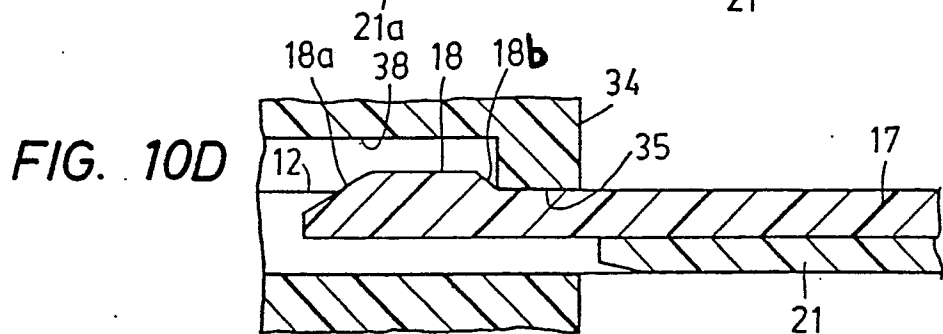
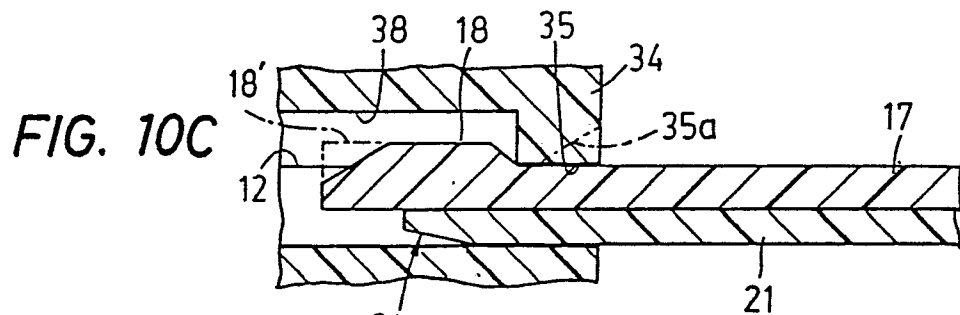
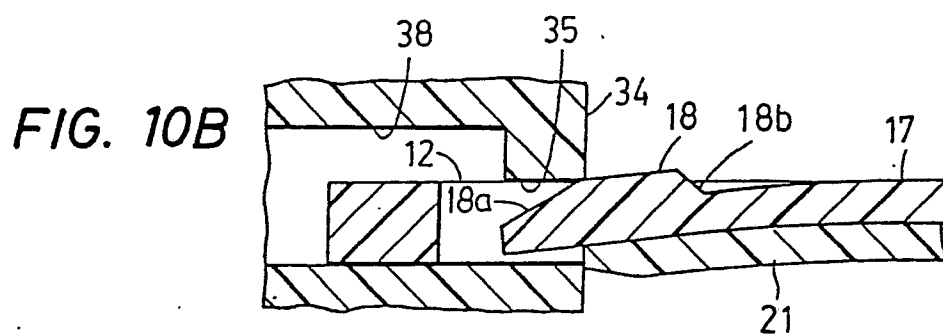
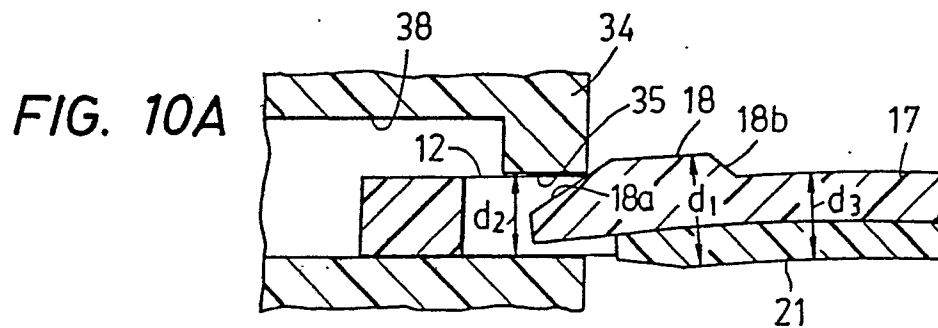


FIG. 11

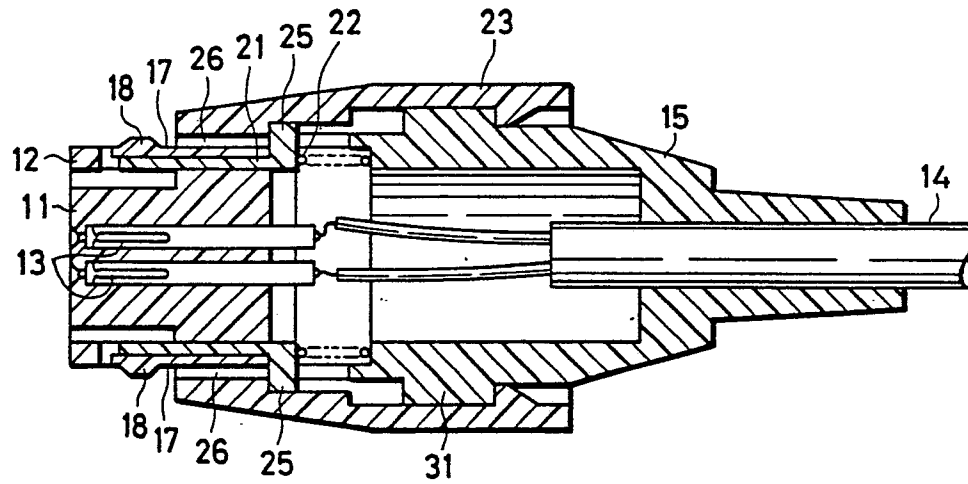


FIG. 12

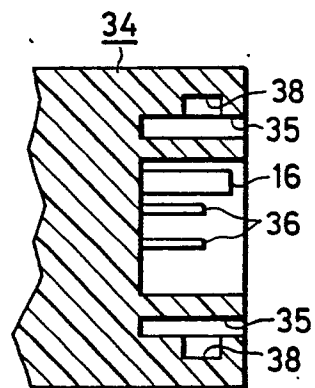


FIG. 13

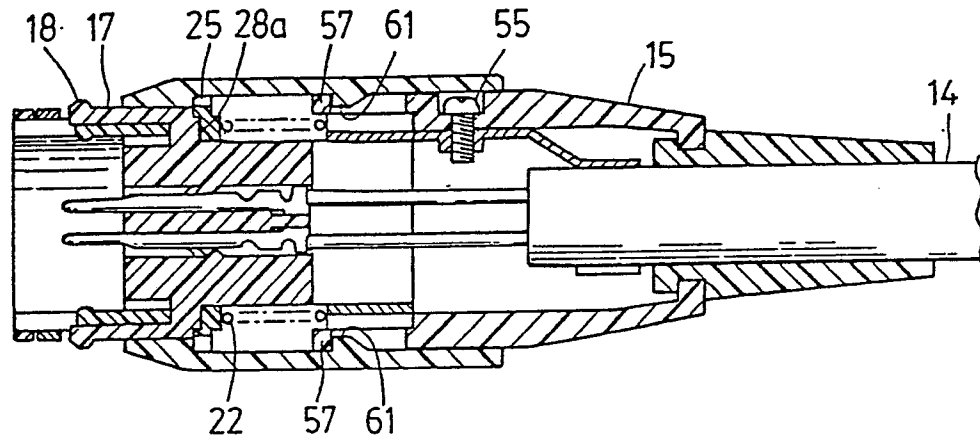


FIG. 15

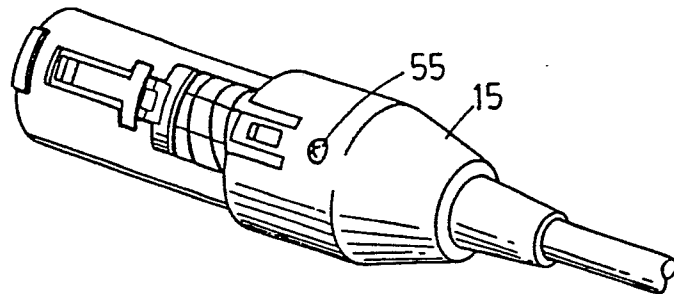


FIG. 16

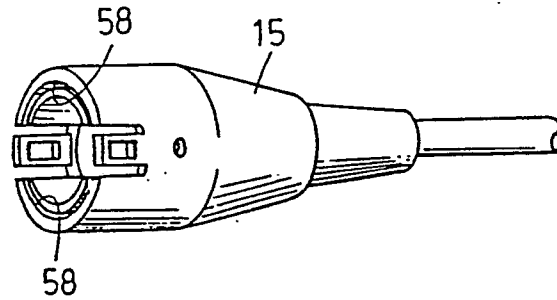


FIG. 14

