

May 23, 1950

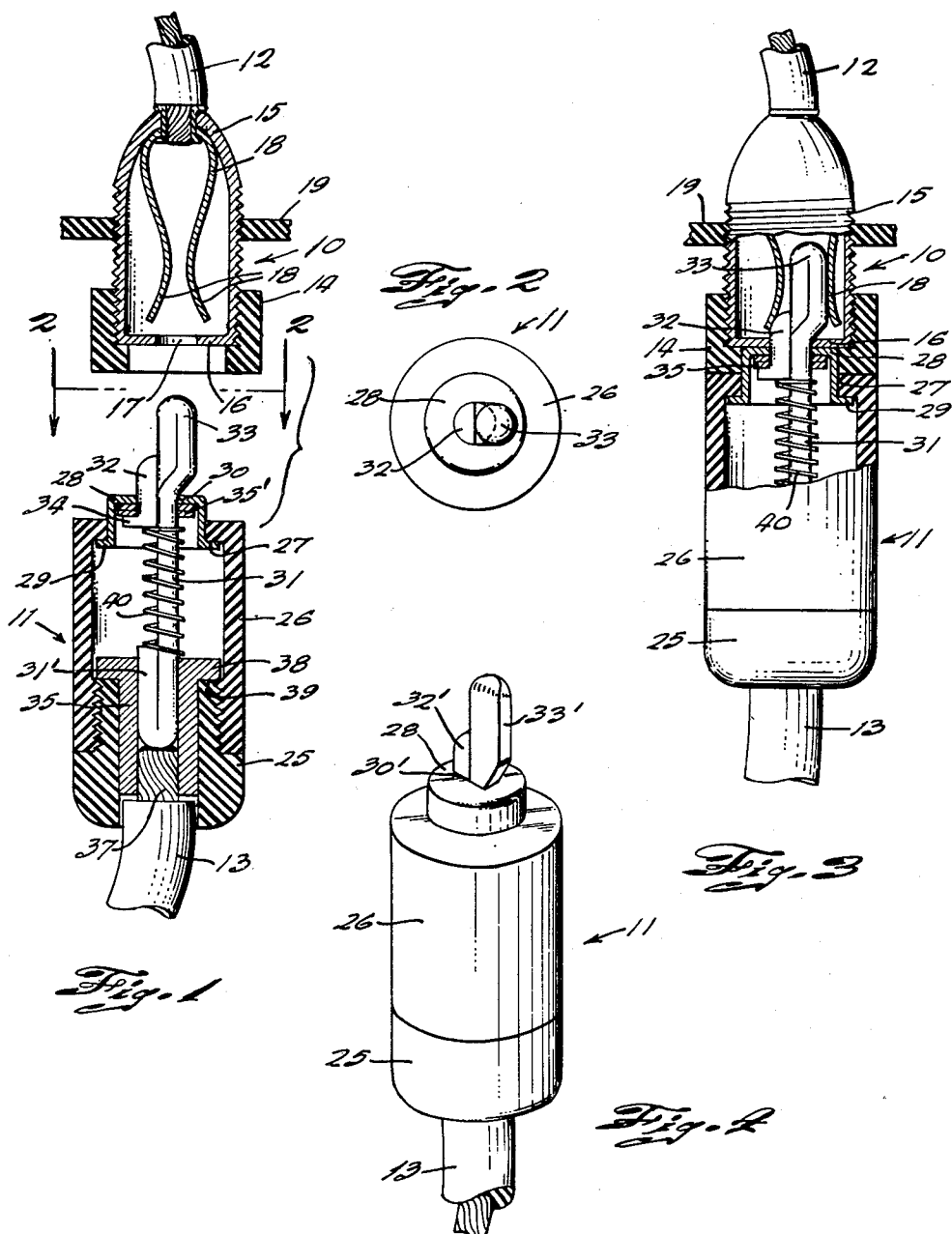
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2,508,767

ELECTRICAL CONNECTOR WITH DOUBLE-ACTION SLEEVE

Filed June 2, 1949

4 Sheets-Sheet 1



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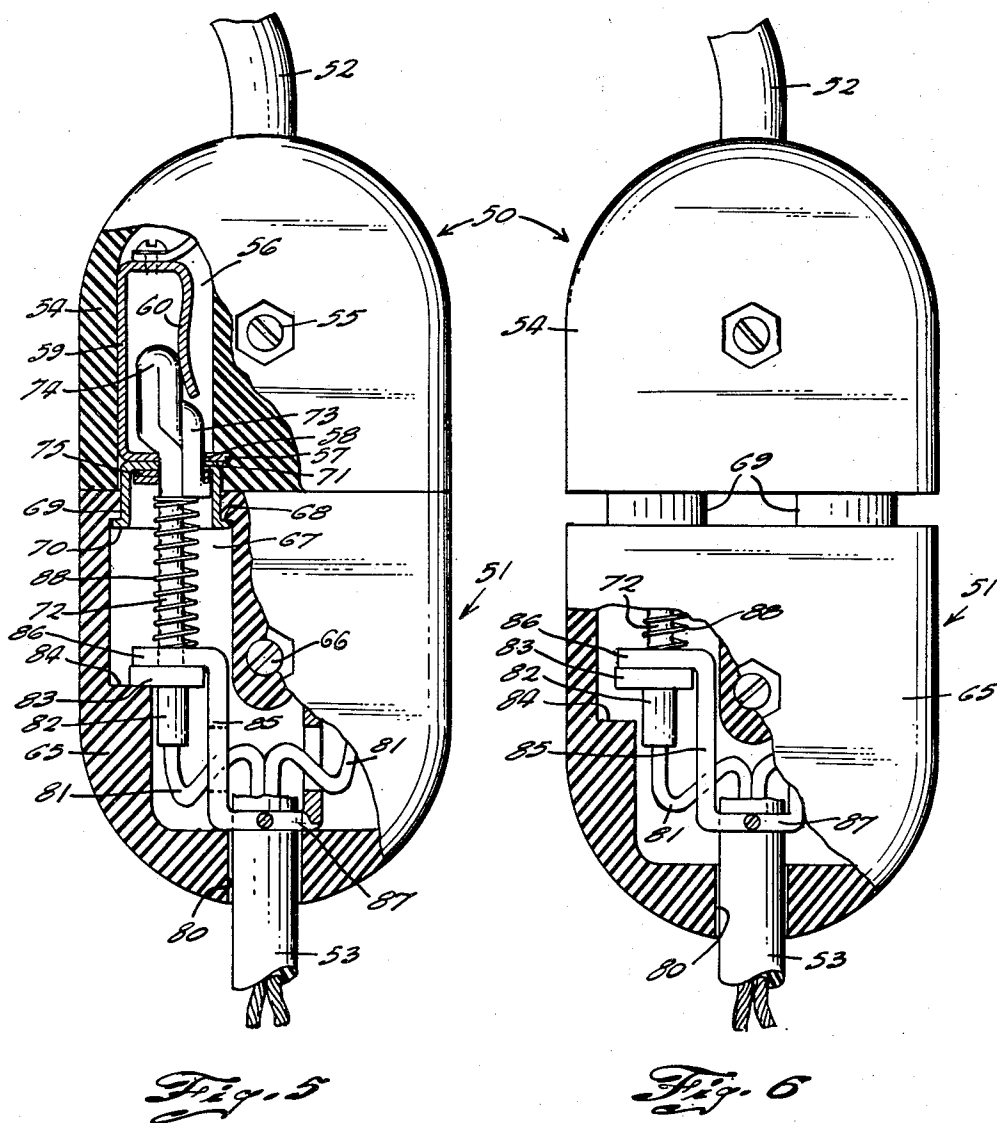
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

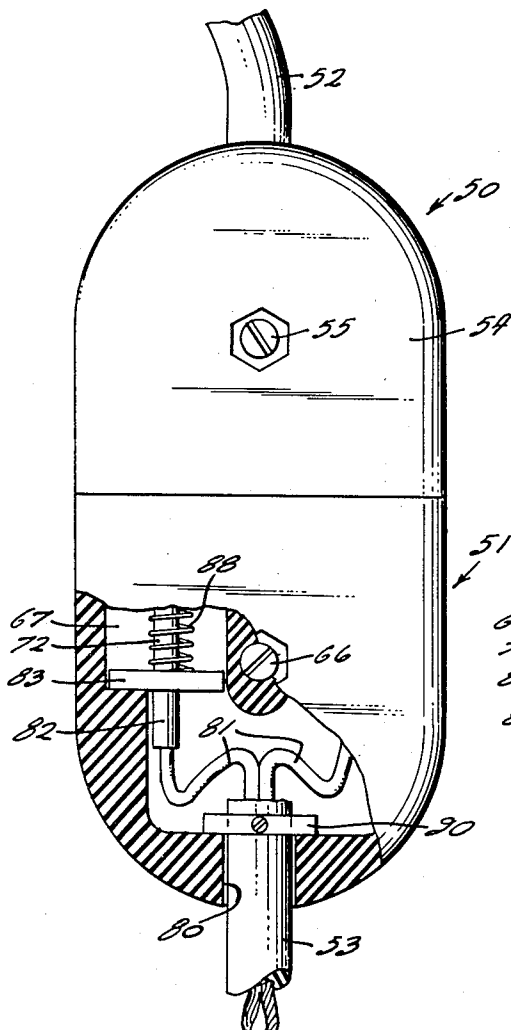


Fig. 7

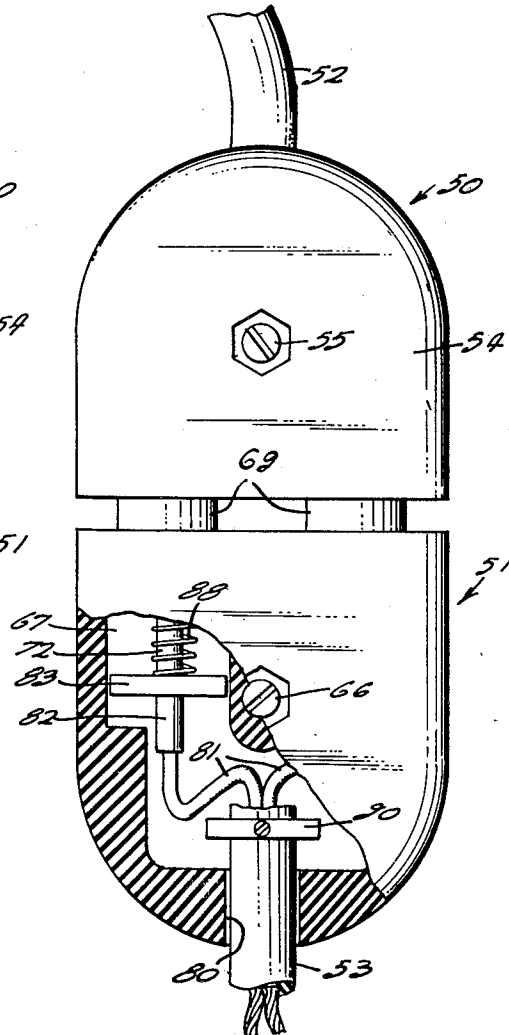


Fig. 8

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4 Sheets-Sheet 4

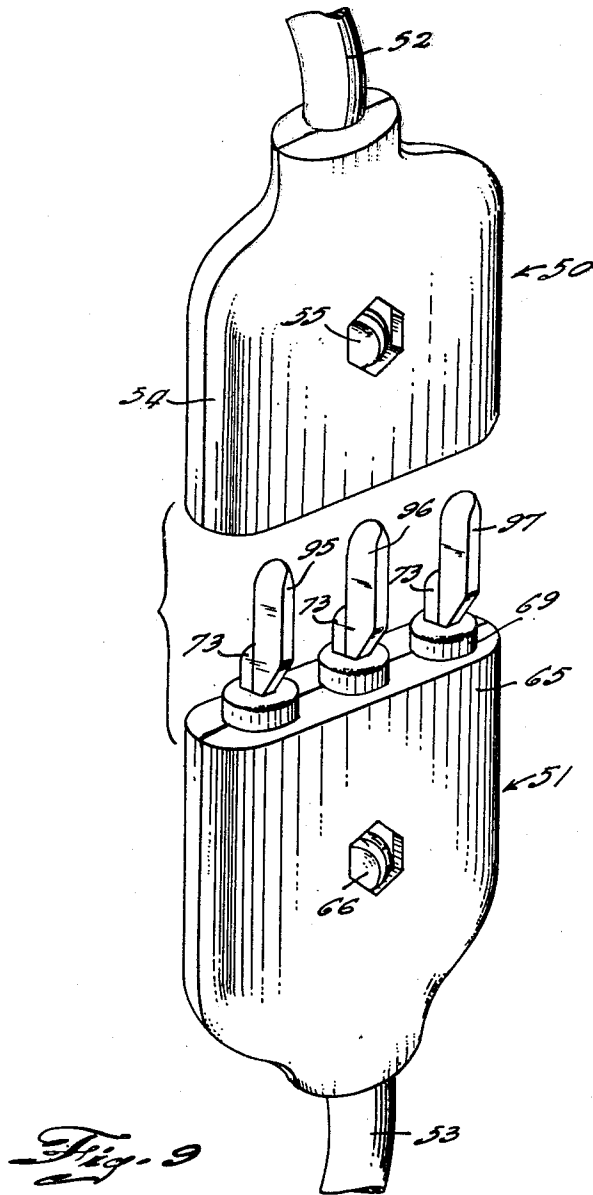


Fig. 9

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UNITED STATES PATENT OFFICE

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ELECTRICAL CONNECTOR WITH DOUBLE-ACTION SLEEVE

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Application June 2, 1949, Serial No. 96,662

21 Claims. (Cl. 173-328)

1

This invention relates to electrical plug and socket connectors, both of the single pole and the multiple pole type.

More particularly, the invention relates to plug and socket connectors of the type comprising a socket including an electrically conducting plate with a hole therethrough; and a plug adapted to be detachably locked to the socket, said plug including a guide member having an opening therethrough, an electrically conducting clamping rod slidable in said guide member opening and having a clamping head outside said guide member protruding from the plug, a wedging slide extending through the guide member opening alongside the clamping rod, the wedging slide and the clamping rod being slidable relative to each other, loaded spring means biasing the guide member with the wedging slide toward a position in which the clamping head is seated against the exterior of the guide member, said conducting plate and said clamping rod being each connectable to an electric conductor to form a socket and a plug contact element respectively.

Electrical connectors of the general type, above referred to, are more fully described in United States Letters Patent 2,423,250, granted to the applicant herein.

With electrical connectors of the general type, above referred to, engagement of the plug and the socket is effected by manipulation of a part of the plug operatively connected with the clamping rod and disengagement or release by manipulation of another part of the plug operatively connected with the wedging slide.

One of the objects of the present invention is to provide an electrical connector of the general type, above referred to, which is considerably simpler and more convenient in operation than the connectors, as hitherto known, in that manipulation of one and the same part of the plug in opposite direction effects engagement and disengagement respectively. Such an arrangement affords the important advantage that the plug and the socket can be connected and disconnected without requiring a change in the grip of the operator.

Another object of the invention is to provide an electrical connector, the two members of which, when engaged, will part upon manipulation of the aforesaid double action part of the plug even though the plug and the socket or the respective wires connected thereto are subjected to a strain or pull tending to separate the connector members. Such an arrangement has the advantage that the two connector members can

2

be separated without preceding relaxation of the strain or pull to which the connector members or the wires connected thereto may be subjected.

Another object of the invention is to provide an electrical connector of the general type, above referred to, the two members of which, when engaged, can be separated at will by manipulation of the aforesaid double action part of the plug, and will automatically become disengaged when subjected to a pull or strain in excess of a predetermined maximal value. Such an arrangement affords the important advantage of eliminating or at least substantially reducing the danger of the wires being pulled out of one or both the connector members in an effort to separate the connector members by a pull on a wire or as a result of an accidental excessive pull caused for instance by a person stumbling over a wire or by the weight of an implement connected by means of the connector. As is well known, pulling of wires out of a plug or socket is a not infrequent source of short circuits or circuit failures.

Other and further objects, features and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims forming part of the application.

In the accompanying drawing several now preferred embodiments of the invention are shown by way of illustration and not by way of limitation.

In the drawings:

Fig. 1 is a longitudinal sectional view of an electrical single pole connector according to the invention, the plug and socket being shown disengaged one from the other.

Fig. 2 is a plan view taken on line 2-2 of Fig. 1.

Fig. 3 is a longitudinal sectional view of the same connector as shown in Fig. 1, the plug and the socket being illustrated in an engaged position.

Fig. 4 is a perspective view of a modification of a plug according to the invention.

Fig. 5 is an elevational side view, partly in section, showing a twin pole plug and socket according to the invention, the two connector members being illustrated in engaged position.

Fig. 6 shows the same connector as Fig. 5 with the plug and the socket in partly disengaged positions.

Fig. 7 is an elevational side view, partly in section, of a connector arranged to separate automatically in response to an excessive pull on the plug wire, the plug and the socket being shown in fully engaged positions.

Fig. 8 shows the same connector as Fig. 7, with

3

the connector members in a partly disengaged position, and

Fig. 9 is a perspective view of a multiple pole connector according to the invention, the socket and the plug being shown fully disengaged one from the other.

Referring first to Figs. 1 to 3 in detail, the electrical connector according to these figures comprises a socket generally designated by 10 and a plug generally designated by 11.

The connector according to Figs. 1 to 3 is a single pole plug, a wire 12 being connected to the socket and a wire 13 to the plug.

The socket comprises an insulation sleeve 14 made of any suitable insulation material such as rubber or plastic. The sleeve serves to receive, by means of an internal thread or a tight fit, a substantially cup-shaped metal sleeve 15 through which wire 12 is inserted in electric contact with the sleeve. The sleeve 15 has at its open end an electrically conducting plate 16 with an opening 17 therethrough. The purpose and the arrangement of plate 16 and opening 17 therethrough will be more fully explained hereinafter.

In certain instances, it is advantageous to equip the socket with contact springs 18 supported within metal sleeve 15 and electrically connected with wire 12. Plate 16 and contact springs 18—if provided—constitute the contact element of the socket, hereinafter sometimes referred to as the "receiving contact element."

Socket 10 may be supported by an insulation plate or nut 19.

The plug comprises a substantially cup-shaped member 25 having an opening in its rounded bottom wall for insertion of wire 13. Cup 25 supports a sleeve 26 threaded upon or otherwise secured to cup 25. As shown, cup 25 and sleeve 26 may be made of insulation material. The forward end of sleeve 26 is provided with an inwardly extending flange 27 (or lugs) serving to retain a guide member 28 in sleeve 26. The guide member is shown as a metal cup having at its open end an outwardly extending flange 29 (or lugs) engageable with flange 27. The bottom wall of cup 28 has an opening 30 therethrough through which a substantially rigid electrically conducting clamping rod 31 and a wedging slide 32 are slidably extended, the wedging slide being disposed alongside clamping rod 31. The portion of the clamping rod protruding from cup 28 is enlarged to form a clamping head 33. The clamping head can be formed by any suitable means. In the exemplification, as shown in Figs. 1 to 3, it is formed by doubling the end of rod 31 so that the head is eccentric to the rod axis and overhangs opening 30 of cup 28. The wedging slide 32 has a flange or collar 34 at its inner end for retaining the wedging slide within cup 28 and limiting movement of the wedging slide toward the clamping head. One or more washers 35 may be provided to adjust the position of the wedging slide relative to the clamping head.

The inner end of the clamping rod, that is, the rod end opposite to the clamping head, supports a metal sleeve 35 fixedly secured to the clamping rod and slidable in insulation cup 25. To facilitate attachment of sleeve 35 to the clamping rod the inner end 31' thereof may be doubled, as shown in Fig. 1. The uncovered end 37 or wire 13 inside cup 25 is secured to sleeve 35 by any suitable means such as soldering and, hence, is electrically connected to the clamping rod through sleeve 35. A collar or flange 38 of sleeve 35 engageable with a shoulder 39 formed by the

4

open end of cup 25 serves to limit displacement of the clamping rod in the direction toward the opening in the bottom wall of cup 25.

A loaded compression spring 40 coiled about rod 31 and resting with one end against slide flange 34 and with the other end against sleeve collar 38 urges the wedging slide toward the clamping head and flange 29 of guide cup 28 into engagement with flange 27 of sleeve 26. The spring also urges sleeve collar 38 against cup shoulder 39 thereby causing clamping head 33 to be seated against the bottom wall of cup 28. In other words, all the components of the plug are in the positions shown in Fig. 1 when and if the plug is detached from the socket.

The cross-section of the clamping head is so selected that the same can be inserted into hole 17 of plate 16, preferably the clamping head filling substantially hole 17. The joint cross-section of the wedging slide and the clamping rods, just below the clamping head, is so selected that this joint cross-section substantially fills plate hole 17 while the joint cross-section of the clamping head and the wedging slide is larger than the cross-section of the plate hole so that the clamping head will overhang plate hole 17 when the clamping head is completely passed through plate hole 17, as will be more fully described hereinafter.

The length and position of the wedging slide are preferably so selected that the tip of the clamping head protrudes beyond the preferably rounded tip of the wedging slide when the plug is disengaged from the socket.

The cross-section of the portion of cup 28 protruding from sleeve 26 is so selected that this protruding cup portion can be received by the cup formed by plate 16 and the portion of socket sleeve 14 extending beyond plate 16.

The joint axis of the wedging slide and the clamping rod is preferably symmetrical to the wall of sleeve 26 and also to the side wall of cup 28 to facilitate reception of the protruding portion of cup 28 by the cup portion in the face of the socket.

Let it be assumed that it is desired to apply the plug to the socket. Then, the operator grips either cup 25 or sleeve 26 of the plug and inserts the protruding tip of clamping head 33 into plate hole 17. If now the plug be pressed against the socket, the tip of the slide abuts against plate 16 so that the wedging slide is pressed back relative to the clamping head and guide cup 28 against the action of spring 40. Upon continued slightly transverse movement of the plug toward the socket, the protruding portion of cup 28 will enter the cup portion formed in the face of the socket until the bottom wall of cup 28 abuts against plate 16 and, as a result, cup 28 is pushed back relative to sleeve 26. During this continued forward movement of the plug, the clamping head passes completely through hole 17 so that the rod portion just below the clamping head is now within the hole, thereby leaving space for the wedging slide to be snapped by spring 40 into hole 17. All the parts are now in the positions shown on Fig. 3. Hole 17 is substantially filled by the joint cross-section of the wedging slide and the clamping rod so that the overhanging portion of clamping head 33 prevents a withdrawal of the clamping head through plate hole 17, thereby locking the plug to the socket.

As will be noted, the clamping rod is fixedly held relative to sleeve 26 and cup 25 during the

5

locking operation by reason of rod collar 33 abutting against shoulder 39, thus permitting the previously described displacement of the wedging slide and guide cup 28 relative to sleeve 26.

In the locked position of the plug and the socket as shown in Fig. 3, the slanted edge of the clamping head presses against the edge of plate 16 forming the female contact element. As a result, a good electric contact is established between the male contact element (clamping rod 31) and the female contact element (plate 16) which contact is further improved by the action of spring 40 which always presses the two contact elements against each other thereby eliminating the danger of a poor contact by reason of dirt, oxidation or burning of the contact surfaces. An additional connection is established between clamping head 33 and contact springs 18 if such springs be provided. It will also be noted that the faces of the plug and the socket are now juxtaposed to each other and that the outer walls of the plug and the socket are substantially flush thereby preventing accidental contact with the current carrying elements of the connector.

A pull on wire 13 in a direction tending to separate the two connector members will be transmitted to the clamping rod and the only effect of such pull is to press the clamping head 33 tighter against its seat on plate 16. Similarly, a pull on wire 12 will pull plate 16 against the clamping head without resulting in a separation of the connector members.

In the previous description it is assumed that the plug is pressed against the socket for purpose of locking the two connector members. However, it will be obvious that the two members can also be locked together by holding the plug and pressing the socket against the same.

Finally, it should be mentioned that the wedging slide instead of being slidable relative to the guide cup 28 can be integral with the guide cup, provided the respective parts of the plug are so dimensioned that the guide cup can be pressed back sufficiently to permit complete passage of the clamping head through plate hole 17.

If it now be desired to separate the two connector members, the operator again grips the same part of the plug (sleeve 26 or cup 25) and pulls this part in opposite direction, that is, in the direction away from the socket. As a result, guide cup 28 and with it slide 32 are withdrawn relative to the clamping rod and wire 13 by means of flanges 27 and 28 engaging each other. Since at the beginning of this operation, the clamping rod with its head is still held in the socket, cup 25 and with it sleeve 26 will slide relative to sleeve 35 secured to rod portion 31' and wire 13. Upon withdrawal of slide 32 from plate hole 17, the clamping head 33 can be retracted from the plate hole thus releasing the plug.

Fig. 4 shows a plug the locking mechanism of which is basically identical with the locking mechanism of the plug as hereinbefore described. The plug according to Fig. 4 is modified in that the clamping head 33' has a flat rectangular cross-section as has wedging slide 32' and guide cup opening 30'. As will be obvious, plate hole 17 must also have a corresponding rectangular cross-section.

Figs. 5 and 6 show a twin pole connector. The connector according to Figs. 5 and 6 is similar in principle to the connectors according to Figs. 1 to 4 but modified as to the details of the design.

6

The connector again comprises a socket, generally designated by 50, and a plug, generally designated by 51. Socket 50 is connected to a cable 52 and plug 51 to a cable 53.

Socket 50 comprises a cup-shaped insulation member 54 preferably composed of two symmetrical sections held together by a screw 55. There are provided within insulation member 54 two chambers or compartments 56, one for each pole. An electrically conducting metal bracket 57 having a hole 58 therethrough is secured in each chamber as can best be seen on Fig. 5. Each bracket is connected, preferably by means of an extension 59, to one of the wires of cable 52 so that bracket 57 forms a female contact element. In addition, contact springs 60 may be provided formed by bending off bracket extension 59 and connected to the respective wires of cable 52.

Socket 51 comprises a substantially cup-shaped insulation member 65 preferably composed of two symmetrical sections held together by a screw 66. There are provided within cup 65 two chambers or compartments 67, one for each twin pole. Each compartment has an inwardly extending flange 68 which serves to retain a guide member 69 within the plug. This guide member is shown as being substantially cup-shaped and having an outwardly extending flange 70 at its open end engageable with flange 68. There is provided in the bottom wall of cup 69 an opening 71 through which is slidably passed a substantially rigid electrically conducting rod 72 and a wedging slide 73. The clamping rod has at its end protruding from guide cup 69 a clamping head 74 adapted to be seated against bracket plate 57. One or more washers 75 serve to adjust the position of the wedging slide relative to the clamping head. The relative cross-sections of the clamping rod, the clamping head, the wedging slide and plate hole 58 are the same as were described in connection with Figs. 1 to 3.

Cable 53 is slidably passed through a hole 80 in the rounded bottom wall of insulation cup 65. Each wire 81 of cable 53 is electrically connected to the respective clamping rod preferably by means of a metal sleeve 82 secured to the respective wire and the clamping rod. Each sleeve 82 has a flange or collar 83 secured thereto and adapted to engage a shoulder 84 of insulation cup 65. There is also provided a substantially rigid Z-shaped bracket 85. Arm 86 of the bracket engages the clamping rod abutting against sleeve flange 83 and arm 87 is secured to cable 53, the latter arm being of a length sufficient to prevent slipping of the arm through cup member hole 80. As can best be seen on Fig. 5, arm 87 is adapted to abut against the inner wall of the bottom of cup member 65.

A loaded compression spring 88 serves to urge cup 69 with the wedging slide 73 and the clamping rod into the positions shown in Fig. 5 in which flanges 68, 70 and flange 83, shoulder 84 respectively are in engagement.

Let it be assumed that the two connector members engage each other (see Fig. 5) and that it is desired to separate the same. The operator then grips plug insulation member 65 and pulls the same away from the socket. As a result, guide cup 69 and with it slide 73 are retracted relative to the clamping head, flanges 68 and 70 engaging each other. Insulation member 65 can be retracted relative to the clamping rod as the latter with its head is fixedly held in socket plate 57. The relative positions assumed

7

by insulation member 65, clamping rod 72, bracket 85 secured to the clamping rod, and cable 53 during the initial stage of the disengaging action can best be seen on Fig. 6. As will be noted, cable 53 is pulled somewhat into the interior of insulation member 65. As the plug is further pulled away from the socket, slide 73 is finally withdrawn from socket plate hole 57 so that the clamping head can be retracted from the socket plate. The two connector members are now separated and spring 88 returns the various displaced parts of the plug substantially into the positions shown in Fig. 5.

For purpose of applying the plug to the socket, the operator again grips the same part of the plug, to wit, insulation member 65 and presses the plug against the socket. The two connector members, then, will be locked together in a manner similar to the one described in connection with the exemplification of the invention according to Figs. 1 to 3.

As will be apparent, the two connector members can also be locked together by holding the plug and pressing the socket against the same.

In the event, a pull is applied to either of the cables, say to cable 53, tending to separate the connector members, such pull will be transmitted by bracket 85 to the clamping rod and hence to the clamping head. As a result, the clamping head will be pressed tighter against its seat on socket plate 57, bracket arm 87 preventing pulling of the cable out of the plug. In other words, bracket 85 and the parts associated therewith prevent strain on the cable proper.

As will appear from the previous description, the hereinbefore described connectors according to the invention will not part in response to a pull applied to the wire connections and tending to separate the connector members. However, for certain applications it is advantageous that the connector members separate in response to an excessive wire pull. Figs. 7 and 8 show a connector of this type.

The connector according to Figs. 7 and 8 is similar to the connector of Figs. 5 and 6 as to the general design and the locking mechanism. Similar reference characters are employed to designate corresponding parts. It will be apparent from the previous description that the plug of Figs. 7 and 8 can be locked to the socket and released from the same by actuating the same part 65 in opposite directions.

For purpose of obtaining the previously mentioned maximal release, the Z-shaped bracket 85 of Figs. 5 and 6 is replaced by a disc or collar 90 rigidly secured to cable 53 and resting against the inner bottom wall of plug insulation member 65. Wires 81 of cable 53 are connected to sleeve 82 on the clamping rod with a certain slack within plug insulation member 65 (Figs. 5 and 6 also show such slack of the wires but in the connector according to these figures the slack could have been omitted since no relative movement between the clamping rod and cable 53 or bracket 87 secured to the cable takes place).

Let it be assumed that a pull is applied to cable 53 tending to separate the plug from the socket. As will be apparent, this pull is transmitted by collar 90 directly to insulating member 65 and, when the pull is strong enough to overcome the action of spring 88, will retract insulation member 65 and with it guide cup 69 and wedging slide 73 so that the plug is released from the socket. In other words, a pull on cable 53 is in effect a pull on the release member 65 and the

8

locking strength with which the plug is locked to the socket is entirely controlled by the strength of spring 88. Hence, by proper selection or adjustment of this spring, the connector according to Figs. 7 and 8 can be set for any selected pulling force in response to which the connector members will automatically part.

The poles of the connectors according to Figs. 5 to 8 are shown as round poles. However, it should be understood that the poles can also be designed as flat poles.

Fig. 9 shows a multiple pole connector having three poles 95, 96 and 97 shown as flat poles. The design of the locking mechanism and other component parts of the connector according to Fig. 9 may be the same as has been described in connection with Figs. 5 and 6 or Figs. 7 and 8 respectively.

While the invention has been described in detail with respect to certain now preferred examples and embodiments of the invention it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended, therefore, to cover all such changes and modifications in the appended claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. An electrical connector of the type comprising a socket including an electrically conducting plate with a hole therethrough; and a plug adapted to be detachably locked to the socket, said plug including a guide member having an opening therethrough, an electrically conducting clamping rod slidable in said guide member opening and having a clamping head outside said guide member protruding from the plug, a wedging slide protruding from the guide member alongside the clamping rod, the wedging slide and the clamping rod being slidable relative to each other, loaded spring means biasing the guide member with the wedging slide toward a position in which the clamping head is seated against the exterior of the guide member, said conducting plate and said clamping rod being each connectable to an electric conductor to form a socket and a plug contact element respectively, in combination with a double action control member for effecting connection and disconnection of the socket and the plug, said control member comprising a sleeve member in which said guide member is slidably disposed with the clamping rod extending into the sleeve member, first one-way coupling means operative for coupling the sleeve member with the guide member, and second one-way coupling means operative for coupling the sleeve member with the clamping rod, said coupling means being arranged to be effective for coupling action in opposite direction so as to provide for displacement of the guide member with the wedging slide relative to the sleeve member and the clamping head upon a sleeve member movement in one direction and for displacement of the guide member with the wedging slide conjointly with the sleeve member relative to the clamping head upon a sleeve member movement in the opposite direction, whereby, upon inserting the clamping head into the socket plate hole and moving the sleeve member toward the socket, the guide member together with the slide is pushed back relative to the clamping head thereby permitting passage of the clamping head through the plate hole and into electric contact with the plate, said spring means returning the slide into its position alongside the clamping head for preventing

9

withdrawal of the clamping head from the plate hole and locking the contact elements of the socket and the plug in electric contact, and whereby, upon withdrawal of the sleeve member conjointly with the guide member and the slide relative to the clamping head lodged in the socket, the slide is retracted from the plate hole for permitting passage of the clamping head through the plate hole and separation of the contact elements.

2. An electrical connector as described in claim 1, in combination with yieldable contact means mounted within the socket and adapted to be engaged by said clamping head upon passage thereof through said hole in the socket plate.

3. An electrical connector as described in claim 1, wherein said first one-way coupling means comprise coacting abutment portions on the sleeve member and the guide member respectively engageable one with the other to couple the guide member together with the wedging slide to the sleeve member for conjoint movement in one direction while providing for displacement of the guide member and the slide relative to the sleeve member in the opposite direction.

4. An electrical connector as described in claim 1, wherein said second one-way coupling means comprise coacting abutment portions on the sleeve member and the clamping rod respectively engageable one with the other to limit relative displacement of the clamping rod and the sleeve member in the direction for moving the clamping head toward the sleeve member while providing for displacement of the sleeve member relative to the clamping head in a direction away from the latter.

5. An electrical connector of the type comprising a socket including an electrically conducting plate with a hole therethrough; and a plug adapted to be detachably locked to the socket, said plug including a guide member having an opening therethrough, an electrically conducting clamping rod slidable in said guide member opening and having a clamping head outside said guide member protruding from the plug, a wedging slide protruding from the guide member alongside the clamping rod, said wedging slide and said clamping rod being slidable relative to each other, loaded spring means biasing the guide member with the wedging slide toward a position in which the clamping head is seated against the exterior of the guide member, said conducting plate and said clamping rod being each connected to an electric conductor to form a socket and a plug contact element respectively adapted to engage each other upon insertion of the clamping head in the socket plate hole, in combination with a double action control member for effecting connection and disconnection of the socket and the plug, said control member comprising a sleeve member closed at one end by a bottom wall having an opening therethrough, said guide member being slidably disposed within the sleeve member with the clamping rod extending into the sleeve member, the conductor connected to the clamping rod being extended through said bottom opening, first one-way coupling means operative for coupling the sleeve member with the guide member, and second one-way coupling means operative for coupling the sleeve member with the clamping rod, said first coupling means including a flange at the sleeve member engageable with the guide member and positioned to provide for movement of the guide member with the wedging slide relative to the

10

sleeve member and the clamping head upon insertion of the clamping head into the socket plate opening and movement of the sleeve member toward the socket plate, said second coupling means including an abutment member extending from the clamping rod and engageable with a shoulder within the sleeve member, said abutment member and shoulder positioned to provide for movement of the guide member with the wedging slide jointly with the sleeve member relative to the clamping head upon movement of the sleeve member away from the socket plate with the clamping head inserted in the socket plate opening, said spring means urging said guide member and said abutment member into engagement with the flange and the shoulder respectively.

6. An electrical connector as described in claim 5, wherein said socket includes a member having a substantially cup-shaped portion, the bottom of said cup portion being formed by said plate, and wherein said plug guide member comprises a substantially cup-shaped portion having the said opening in its bottom wall and at its open end an outwardly extending flange engageable with the flange of the plug sleeve member, said cup portion of the guide member being positioned to protrude from the open end of the sleeve member when said flanges engage each other, said cup portion of the socket member being arranged to receive the protruding cup portion of the guide member when the plug is applied to the socket.

7. An electrical connector as described in claim 5, wherein said socket includes a member having a substantially cup-shaped portion, the bottom of said cup portion being formed by said plate, and wherein said plug guide member comprises a substantially cup-shaped portion having the said opening in its bottom wall and at its open end an outwardly extending flange engageable with the flange of the plug sleeve member, said cup portion of the guide member being positioned to protrude from the plug sleeve member at the end thereof opposite to said bottom wall when said flanges engage each other, said cup portion of the socket member being arranged to receive the protruding cup portion of the guide member when the plug is applied to the socket, and wherein said wedging slide is slidable relative to the cup portion of the guide member and has a lateral projection adapted to abut against the inner side of the bottom wall of the cup portion of the guide member, and wherein said loaded spring means are abutting against said slide projection and against said abutment member extending from the clamping rod for urging said cup portion of the guide member and said abutment member of the clamping rod into engagement with the flange and the shoulder respectively of the sleeve member.

8. An electrical connector as described in claim 5, wherein the said abutment member extending from the clamping rod comprises an electrically conducting sleeve, part of said sleeve fixedly receiving the clamping rod end and another part fixedly receiving said conductor connected to the clamping rod, the said conductor being slidably passed through the bottom wall opening of the sleeve member, said electrically conducting sleeve having an outwardly extending flange engageable with said shoulder within the sleeve member.

9. An electrical connector as described in claim 5, in combination with retaining means within the sleeve member arranged to grip the conductor extended through said bottom wall opening so as to prevent pulling of the same out of the sleeve

11

member, and wherein the length of the said conductor within the sleeve member is selected so as to provide sufficient slack for the said movement of the sleeve member relative to the clamping rod.

10. An electrical connector as described in claim 5, in combination with retaining means for the conductor connected to the clamping rod provided within said sleeve member, said retaining means comprising a first portion gripping the second conductor so as to prevent pulling of the same out of the sleeve member and a second portion rigidly connected with the first portion and secured to the clamping rod for conjoint movement of the clamping rod and the said retaining means relative to the sleeve member when the plug is withdrawn from an engaged socket, said relative movement causing the said conductor to be partly pulled into the sleeve member.

11. An electrical connector as described in claim 5, in combination with locking means within the sleeve member engaging said conductor connected to the clamping rod so as to transmit a pull applied to the said conductor to the sleeve member for causing retraction of the sleeve member conjointly with the guide member and the wedging slide relative to the clamping head in response to a pull in excess of the strength of the loaded spring means.

12. An electrical connector as described in claim 5, in combination with locking means for the conductor connected to the clamping rod, said locking means comprising a collar secured to the said conductor and disposed within the plug sleeve member in a position abutting against the inside of said bottom wall of the sleeve member for transmitting a pull applied to the said conductor to the sleeve member and causing retraction of the sleeve member conjointly with the guide member and the wedging slide relative to the clamping head in response to a pull in excess of the strength of the loaded spring means, thereby releasing the plug from an engaged socket.

13. An electrical connector plug of the type comprising a guide member having an opening therethrough, an electrically conducting clamping rod slidable in said guide member opening and having a clamping head outside said guide member protruding from the plug, a wedging slide protruding from the guide member alongside the clamping rod, said wedging slide and clamping rod being slidable relative to each other, loaded spring means biasing the guide member with the wedging slide toward a position in which the clamping head is seated against the exterior of the guide members, said clamping rod being connected to an electric conductor to form a plug contact element, in combination with a double action control member comprising a sleeve member in which said guide member is slidably disposed with the clamping rod extending into the sleeve member, first one-way coupling means operative for coupling the sleeve member with the guide member and second one-way coupling means operative for coupling the sleeve member with the clamping rod, said coupling means being arranged to be effective for coupling action in opposite direction so as to provide for displacement of the guide member with the wedging slide relative to the sleeve member and the clamping head upon a sleeve member movement in one direction and for displacement of the guide member with the wedging slide conjointly with the sleeve member relative to the clamping head upon a sleeve member movement in the opposite direction.

14. An electrical connector plug as described

12

in claim 13, wherein said first one-way coupling means comprise coacting abutment portions on the sleeve member and the guide member respectively engageable one with the other to couple the guide member together with the wedging slide to the sleeve member for conjoint movement in one direction while providing for displacement of the guide member and the slide relative to the sleeve member in the opposite direction.

15. An electrical connector plug as described in claim 13, wherein said second one-way coupling means comprise coacting abutment portions on the sleeve member and clamping rod respectively engageable one with the other to limit relative displacement of the clamping rod and the sleeve member in the direction for moving the clamping head toward the sleeve member while providing for displacement of the sleeve member relative to the clamping head in a direction away from the latter.

16. An electrical connector plug of the type comprising a guide member having an opening therethrough, an electrically conducting clamping rod slidable in said guide member opening and having a clamping head outside said guide member protruding from the plug, a wedging slide protruding from the guide member alongside the clamping rod, said wedging slide and clamping rod being slidable relative to each other, loaded spring means biasing the guide member with the wedging slide toward a position in which the clamping head is seated against the exterior of the guide member, said clamping rod being connected to an electric conductor to form a plug contact element, in combination with a double action control member comprising a sleeve member closed at one end by a bottom wall having an opening therethrough, said guide member being slidably disposed within the sleeve member with the clamping rod extending into the sleeve member, the conductor being extended through said bottom opening, first one-way coupling means operative for coupling the sleeve member with the guide member, and second one-way coupling means operative for coupling the sleeve member with the clamping rod, said first coupling means including a flange at the sleeve member engageable with the guide member and positioned to provide for movement of the guide member with the wedging slide relative to the sleeve member and the clamping head upon insertion of the clamping head into a corresponding opening in an electrically conducting plate of a socket and movement of the sleeve member toward the socket plate, said second coupling means including an abutment member extending from the clamping rod and engageable with a shoulder within the sleeve member, said abutment member and shoulder positioned to provide for movement of the guide member with the wedging slide jointly with the sleeve member relative to the clamping head upon movement of the sleeve member away from the socket plate with the clamping head inserted in the socket plate opening, said spring means urging said guide member and said abutment member into engagement with the flange and the shoulder respectively.

17. An electrical connector plug as described in claim 16, wherein the said abutment member extending from the clamping rod comprises an electrically conducting sleeve, part of said sleeve fixedly receiving the clamping rod and another part fixedly receiving said conductor connected to the clamping rod, the said conductor being

13

slidably passed through the bottom wall opening of the sleeve member, said electrically conducting sleeve having an outwardly extending flange engageable with said shoulder within the sleeve member.

18. An electrical connector plug as described in claim 16, in combination with retaining means within the sleeve member arranged to grip the conductor extended through said bottom wall opening so as to prevent pulling of the same out of the sleeve member, and wherein the length of the said conductor within the sleeve member is selected so as to provide sufficient slack for the said movement of the sleeve member relative to the clamping rod.

19. An electrical connector plug as described in claim 16, in combination with locking means within the sleeve member engaging said conductor connected to the clamping rod so as to transmit a pull applied to the said conductor to the sleeve member for causing retraction of the sleeve member conjointly with the guide member and the wedging slide relative to the clamping head in response to a pull in excess of the strength of the loaded spring means.

20. An electrical connector plug as described in claim 16, in combination with locking means for the conductor connected to the clamping rod, said locking means comprising a collar secured to the said conductor and disposed within the sleeve member in a position abutting against the inside of said bottom wall of the sleeve member

14

for transmitting a pull applied to the said conductor to the sleeve member and causing retraction of the sleeve member conjointly with the guide member and the wedging slide relative to the clamping head in response to a pull in excess of the strength of the loaded spring means.

21. An electrical connector plug as described in claim 16, wherein said guide member comprises a substantially cup-shaped portion having the said opening in its bottom wall and at its open end an outwardly extending flange engageable with the flange of the sleeve member, said cup portion of the guide member being positioned to protrude from the sleeve member at the end thereof opposite to said bottom wall when said flanges engage each other, and wherein said wedging slide is slidable relative to the cup portion of the guide member and has a lateral projection adapted to abut against the inner side of the bottom wall of the cup portion of the guide member, and wherein said loaded spring means are abutting against said slide projection and against said abutment member extending from the clamping rod for urging said cup portion of the guide member and said abutment member of the clamping rod into engagement with the flange and the shoulder respectively of the sleeve member.

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No references cited.