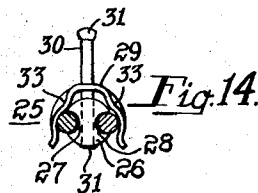
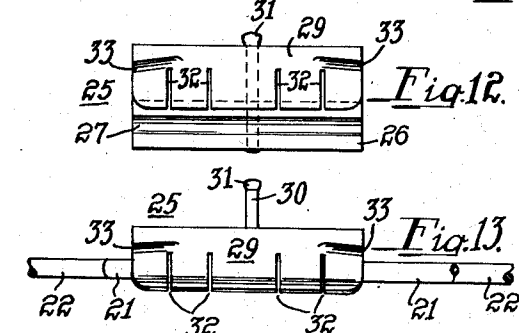
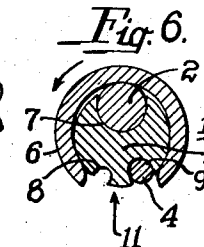
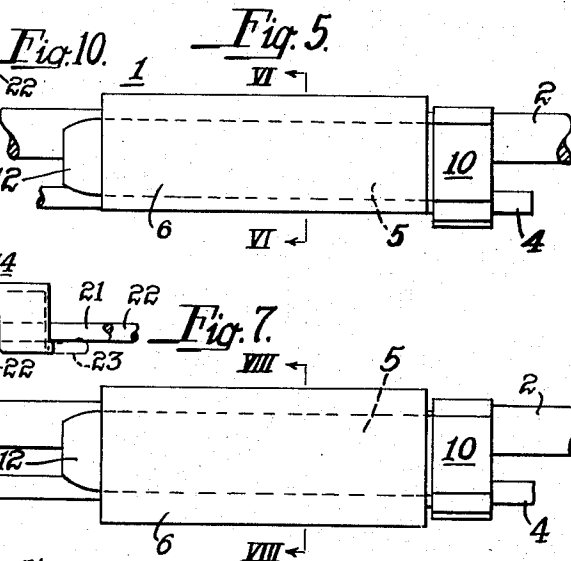
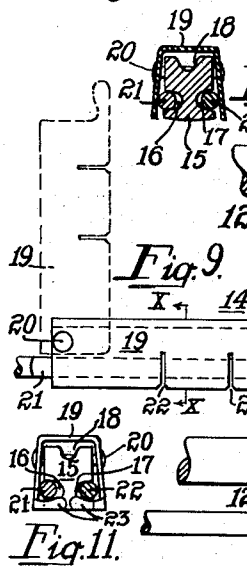
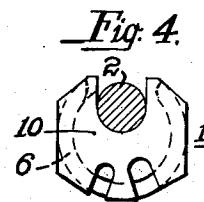
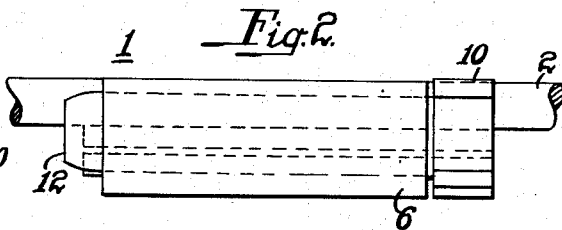
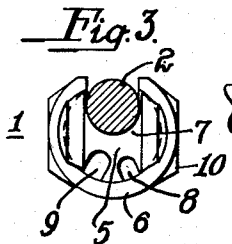
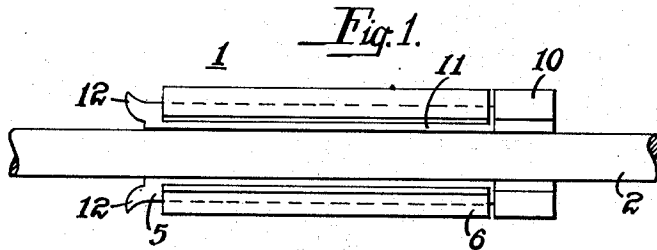


April 9, 1935.

C. L. PEIRCE, JR  
SOLDERLESS CONNECTER

1,997,430

Filed April 28, 1933



INVENTOR

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## UNITED STATES PATENT OFFICE

1,997,430

## SOLDERLESS CONNECTER

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Application April 28, 1933, Serial No. 668,409

1 Claim. (Cl. 173—263)

This invention relates to solderless connectors such as are employed for coupling electrical conductors. Such connectors are used quite extensively for connecting or attaching service conductors to main feeder lines, for connecting transformer leads to power supply conductors, and for other analogous purposes.

The majority of solderless connectors used in the past and those now supplied to the trade have been constructed substantially in accordance with the disclosure of United States Patent No. 1,206,044 dated November 28, 1916.

There were several objections to these prior art connectors in that in order to attach them to a main feeder conductor, for example, it was necessary to take the connector apart. Since the main conductors were almost always charged or live, it was customary for the workmen when attaching the same, to work with rubber gloves, and for this reason a part of the connector was frequently dropped. Instead of replacing the part dropped, many workmen threw the connector away and started with a new one. Such practice, therefore, resulted in waste of connectors as well as in loss of time.

An object of this invention is the provision of a connector in which the component parts thereof will be always maintained in assembled relation in the operation of coupling a plurality of conductors by means of such a connector.

Another objection to the prior art connectors referred to above was that where the connectors were used for joining conductors of different diameters or gauge, the smaller conductor instead of centering on the larger conductor, tended to move off-center and crowd into the space between one side of the conductor and one side of the connector. For this reason, the connection thus made was not permanently reliable because the pressure between the conductors continually decreased and a loose connection resulted. Also, since the conductors were usually of copper, and only line contact was made between them, they tended to crush at the line of contact and to flow slightly, causing the connection to become loose.

An object of this invention is, therefore, the provision of a connector which shall not become loose in service and in which the electrical connection between conductors shall be made between conductor and connector rather than between conductor and conductor through line contact therebetween, as was the case with the prior art connectors.

In practice it is necessary to cover the connector and bared portions of the conductors with

tape or other insulating material after the connection is completed.

Another object of this invention is, therefore, the provision of a connector having an exterior contour conforming closely to that of the conductors so as to facilitate taping.

A further object of the invention is the provision of a connector having higher current carrying capacity than similar prior art connectors, and still remain cool in service.

Other objects of the invention will, in part, be apparent and will, in part, be obvious from the following description taken in conjunction with the accompanying drawing, in which:

Figure 1 is a top plan view of a connector and a conductor shown in their relative positions when the connector is about to be attached to the conductor;

Fig. 2 is a view taken at right angles to the view shown in Fig. 1;

Fig. 3 is a view of the connector as seen from left to right in Fig. 2;

Fig. 4 is a view of the opposite end of the connector as seen looking from right to left in Fig. 2;

Fig. 5 is a view of the connector after being attached to the conductor shown in Fig. 1 and in position to receive another conductor which is to be connected electrically to the conductor of Figs. 1, 2, 3, and 4;

Fig. 6 is a view in section of the connector taken on line VI—VI of Fig. 5;

Fig. 7 is a view similar to the view of Fig. 5 after the conductors have been clamped in position;

Fig. 8 is a view in section taken on line VIII—VIII of Fig. 7 showing the relative position of the component parts of the connector and the conductors when joined or attached to each other by means of the connectors.

Fig. 9 is a view in side elevation of a connector embodying another form of the invention;

Fig. 10 is a view in section taken on line X—X of Fig. 9;

Fig. 11 is an end view of the connector as seen from right to left in Fig. 9;

Fig. 12 is a view in side elevation of a connector embodying still another form of the invention, the parts being shown in position to receive conductors to be joined thereby;

Fig. 13 is a view in side elevation showing the connector in operative position and connecting a through conductor to a dead end conductor; and

Fig. 14 is an end view of the connector as seen from right to left in Fig. 13.

Throughout the drawing and the specification like reference characters indicate like parts.

In the drawing, a connector 1 embodying what now appears to be a preferred form of the invention, is illustrated. This connector is adapted to provide a permanently reliable electrical connection between a plurality of conductors 2 and 4. The connector may be designed to accommodate conductors of the same size or of different sizes as shown on the drawing.

Connectors of this type are used largely for connecting service conductors to through or feeder conductors, but are also employed for connecting transformer leads to power lines and other analogous purposes. For convenience of description, conductor 2 may be considered as a through or feeder conductor and conductor 4 as service conductor, the former being necessarily larger in diameter, and of higher current carrying capacity than the latter.

Connector 1 in its simplest form, comprises only two parts, a conductor receiving member 5 of current conducting material such as substantially pure copper, and a retaining member 6 adapted to rigidly clamp the conductors and member 5 firmly together to form a permanently reliable connection.

Member 5 as shown, includes a cylindrical portion having conductor receiving grooves 7, 8, and 9, each of different size, extending longitudinally thereof. These grooves are of a size such that the conductors may be pressed into them so that positive contact is made and so that the conductors will be gripped sufficiently to prevent slipping thereof on account of the weight of the conductors.

Member 5 terminates at one end in an enlarged portion 10 having wrench flats to accommodate a tool or suitable implement and grooves 7, 8, and 9 are continued through this portion.

Retaining member 6 may be made in the form of a cylindrical sleeve of suitable resilient spring material, as phosphor bronze having a split or opening 11 therein extending the full length thereof.

The internal diameter of sleeve 6 is made such that it has a snug fit with member 5 without any conductors in the grooves thereof and so that it may be turned thereon. To guard against the possibility of the sleeve slipping off member 5, the end opposite portion 10 is provided with lugs 12 that may be bent outwardly (see Fig. 1) after the sleeve has been mounted in place. Thus sleeve 6 is held in place between the lugs and the enlarged portion 10 of member 5.

In operation, sleeve 6 is turned on member 5 by means of wrenches or tools applied to the sleeve and portion 7 of member 5, until split 11 registers with groove 7. The connector is then mounted on conductor 2 which is forced into groove 7 and the sleeve turned in the direction of the arrow until the conductor is clamped in the groove by the sleeve, (see Fig. 6). When the sleeve is in the position indicated in Fig. 6, a conductor may be placed in either of grooves 8 or 9, depending on the size or gauge thereof. As shown, conductor 4 is placed in groove 9 and sleeve 6 turned to the position shown in Fig. 8, in which position conductors 2 and 4 are wedged in the grooves of member 5 by the resilient sleeve.

It is apparent by inspection of the drawing, that as the conductors are wedged in the grooves of member 5, sleeve 6 is sprung or expanded, and being of resilient material, wedges the conductors into the grooves with a force of sufficient in-

tensity to hold the conductors in place and prevent their slipping or pulling through the grooves of the connector.

While only three conductor receiving grooves have been illustrated in member 5, it will be appreciated that the number of grooves may be varied according to requirements and may be designed to take care of a wide range of conductor sizes.

By properly shaping the grooves and making member 5 of the proper length, it will be apparent that the surface contact that may be had between the conductors and member 5 may be made ample and sufficient to carry current equal to the full capacity of the conductors. Where such large surface contact is provided, the conductors will not be overstressed so as to cause them to deform or the metal thereof to flow; therefore a loose connection is not likely to occur and the connection will be one which is permanently reliable.

After the conductors have been joined as above described, the connector may be wrapped with tape as is customary practice.

It will be observed also that since the sleeve embraces member 5 and is retained thereon by the enlarged portion 7 and the lugs 12, linemen may work freely and unhampered by the possibility of the component parts of the connector being separated in the act of joining conductors thereby.

In Figs. 9, 10, and 11 a connector 14 is shown that comprises a bar 15 of current conducting material having longitudinally extending conductor receiving grooves 16, 17, and 18 formed in different sides thereof, and a resilient sleeve or clip 19 of substantially U-shape adapted to be sprung into place on the bar. The sleeve may be hinged at one end to one end of bar 15 by means of a through-pin 20. This pin prevents any of the parts of the connector from being dropped when linemen are connecting conductors therewith.

As indicated, the connector is employed to connect a dead end conductor 21 to a through conductor 22, these conductors being disposed in grooves 16 and 17 located at opposite faces of bar 14. A conductor may be placed in groove 18 also. In practice it is customary to connect only one dead end conductor to a through conductor, so that in nearly all cases only two of the grooves indicated will be occupied, although it is evident that all of the grooves may be utilized if necessary.

Sleeve or clip 19 may be slit as at 22 to render the same more flexible and adaptable to conductors that may have kinks or rough spots, and cause the connector to grip the conductor uniformly through the length of the grooves.

To connect a dead end conductor to a through conductor, sleeve or clip 19 is turned to the broken line position of Fig. 9, the through conductor placed in a groove, say groove 17, and the dead end conductor placed in either groove 16 or 18, say groove 16, and the clip sprung into the position shown in full lines in Figs. 9, 10, and 11. The pressure exerted by the clip on the conductors wedges them positively in the grooves of bar 14 and provides positive electric contact therebetween.

In order to guard against the possibility of the clip working loose from the conductors, one or both sides of the clip may be formed with lugs or ears 23 adapted to be bent under the conductors and across one end of bar 14 after the clip has been sprung into position. When bent

across the end of bar 14 as shown in Fig. 11, clip 19 is locked in place. After the connection has been made, the connector may be wrapped with tape; the connector being relatively long and narrow and of smooth contour, the taping may be done quickly and smoothly.

In Figs. 12, 13, and 14, a connector 25 embodying another form of the invention is illustrated. This connector comprises a member 26, made from stock, preferably round, having diametrically opposed, longitudinally extending conductor receiving grooves 27 and 28 formed therein, and a resilient clip 29 adapted to be sprung into place over member 26. These parts of the connector may be connected together by an elongated through-pin 30 having stops 31 at both ends which allow sufficient relative movement of the parts to permit the insertion or removal of conductors from grooves 27 and 28.

Pin 30 permits the linemen to handle the connector without danger of dropping one or the other of the parts thereof. The opposite longitudinal edges of the clip may be slit at several points, as at 32, in order to make the clip more flexible and cause it to grip the conductors uniformly throughout the full length of the connector.

To increase the grip or pressure exerted by the

ends of the clip on the conductors, the ends of the clip may be crimped as at 33.

In operation, clip 29 is raised to the position indicated in Fig. 12, conductors 21 and 22 fitted into grooves 27 and 28 and the clip sprung into place over member 26 and the conductors, see Figs. 13 and 14. When clip 29 is in operative position the conductors are wedged tightly in the grooves, after which, the connector may be taped.

While several forms of the invention have been shown and described, it will be understood and appreciated by those skilled in this art that various modifications and changes may be made in the connectors as a whole or in their component parts, without departing either from the spirit or the scope of the invention.

It is desired therefore, that only such limitations shall be placed on the invention as are imposed by the prior art and the appended claim.

What I claim as new and desire to secure by Letters Patent is:

A solderless connector comprising a bar of metal having longitudinal conductor receiving grooves on opposite sides thereof, and an elongated U-shaped clip of resilient material, hinged to the bar, and adapted to be sprung into place over said bar and clamp conductors into said grooves.

CHARLES L. PEIRCE, JR.