

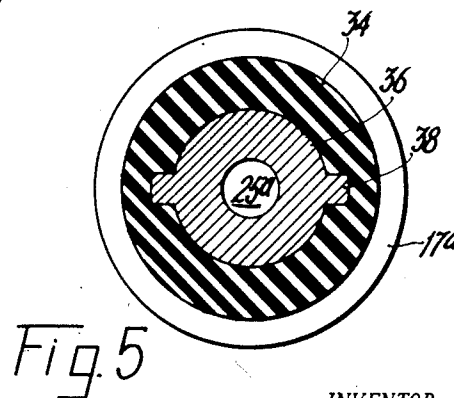
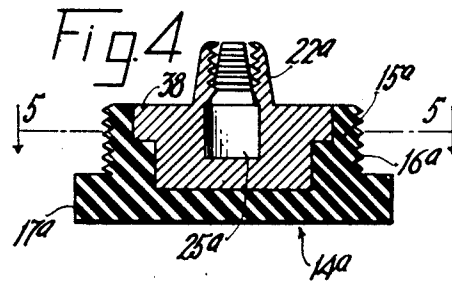
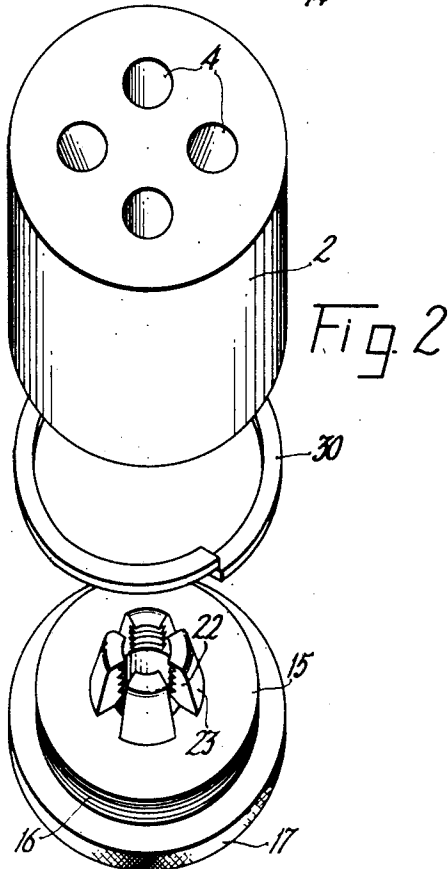
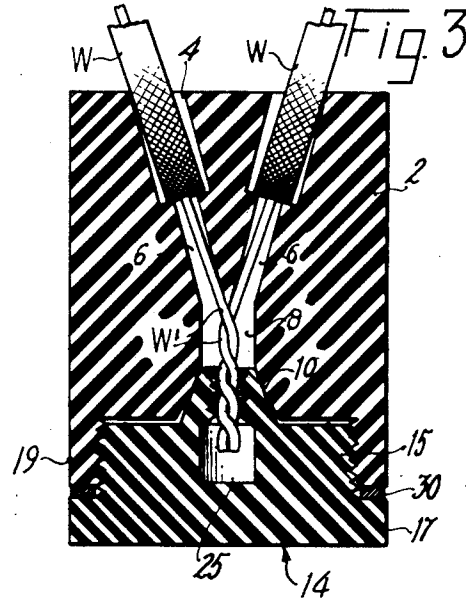
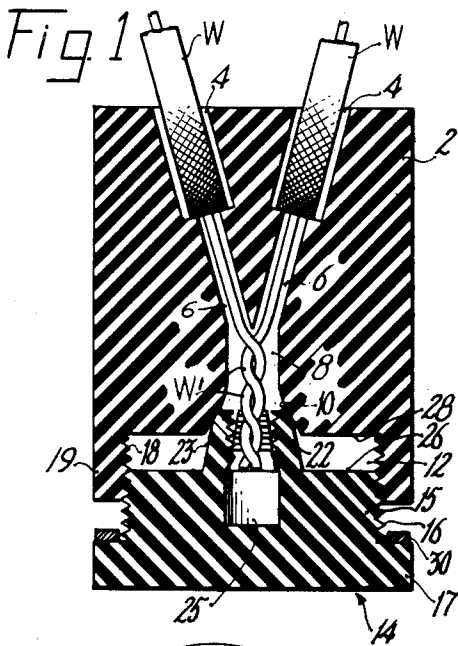
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B. GAY

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CONNECTORS FOR ELECTRICAL CIRCUIT WIRES

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INVENTOR.

BY

Bert Gay
Chauncey M. Sincubaugh
ATTORNEY

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CONNECTORS FOR ELECTRICAL CIRCUIT WIRES

Bert Gay, Manchester, Conn., assignor of one-half to William F. Swingle, Hartford, Conn.

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1 Claim. (Cl. 174—87)

This invention relates to connectors for electrical circuit wires.

It has been common practice, in connecting electrical circuit wires, to twist together the bared end-portions of the wires. The twisted wires have then been wrapped with insulating tape to form a protective insulating cover over the same.

The twisted end portions of the wires often become loosened from each other by the strains exerted on the wires so that a good electrical connection between the wires is not maintained. To avoid this difficulty, it has been the practice to solder together the end portions of the wires. This has added considerably to the expense of installing an electrical system.

The wrapping of the bared ends of the wires with insulating tape to form a satisfactory insulating covering requires some skill and a great deal of care and this also adds substantially to the cost of the installation.

To avoid the disadvantages in the above described methods followed in connecting the bared ends of electrical circuit wires and in insulating the same, various forms of connectors have been produced.

Certain important objects of the present invention are to improve the construction and mode of operation of connectors to be applied to the bared end portions of electrical circuit wires and to produce a novel connector construction which may be quickly and easily applied to the wires, which will hold the wires securely in electrical connection and which will provide highly satisfactory insulation for the wires.

Another object of the invention is to produce a novel and improved connector for the bared ends of electrical circuit wires which will prevent the twisted wires from becoming loosened in the use of the circuit and will tighten the twist between the wires when it is applied thereto.

Another object of the invention is to provide a connector for the stripped end portions of electrical circuit wires of the type arranged to grip or clamp the wires which may be readily adapted to different numbers of wires and to wires of different sizes.

Another object of the invention is to produce a connector construction for the stripped or bared ends of electrical circuit wires, which, after its application to two or more wires, may be readily removed from the wires without injury to the parts of the connector and used again.

With the above and other objects in view, the invention consists in a connector embodying the novel and improved features, constructions and combinations of parts hereinafter described and particularly pointed out in the claims, the advantages of which will be readily understood and appreciated by those skilled in the art.

The invention will be clearly understood from the accompanying drawings illustrating connector constructions embodying the invention in its preferred forms and the following detailed description of the constructions therein shown.

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In the drawings,

Fig. 1 is a view in axial section of a connector embodying the invention, showing the same applied to two electrical circuit wires.

Fig. 2 is a cabinet perspective illustrating the parts of the connector shown in Fig. 1 in exploded condition.

Fig. 3 is a view similar to Fig. 1 illustrating certain of the parts of the connector in different positions.

Fig. 4 is a view in axial section illustrating one of the parts of the connector in modified form, and

Fig. 5 is a view in horizontal section taken substantially on the line 5—5 of Fig. 4.

In the form of the invention disclosed in this application, the connector is shown as embodied in a construction for gripping and holding two, three or four wires. It is to be understood that the connector may be varied in construction to receive any number of wires. The connector is shown as applied to only two of the wires in connection with which it may be used. The manner in which it may be used with three or four wires will be readily understood from the following description.

In the construction shown, the connector comprises two members constructed to be connected in interfitting relation to form a covering or casing arranged to surround completely the bared or stripped end portions of the wires and the adjacent unstripped portions to insulate effectively the end portions of the wires. One of these casing members consists of a block 2 preferably cylindrical in form and made of insulating material such as Lucite, in which are drilled a series of bores or cylindrical channels 4 all directed toward the axis of the block 2 at an acute angle thereto. These channels are sufficiently large to receive the portions W of the wires to which the connector is to be applied with the insulation thereon. The block is drilled with a series of channels 6 leading from the inner ends of the channels 4 in substantially the same directions. The bores or channels 6 are somewhat smaller in diameter than the channels 4 and are arranged to receive the bared or stripped end portions W' of the wires. The channels 6 are all connected, at their inner ends, with a central chamber 8 in the block 2 into which the bared end portions of the wires, passed through the channels 6, may be projected.

The central chamber 8, at the end thereof opposite that to which the channels 6 are connected, opens into a substantially cylindrical recess 12 in the block and the end portion of the chamber connected with the recess is formed with a flaring wall 10.

In connecting the end portions of the wires W, the insulation is stripped for a predetermined distance from the ends of the wires and the wires are inserted in the channels 4 and 6 until the insulated body portions W of the wires are engaged in the channels 4 preferably up to the shoulders at the junctures of the respective channels 4 and 6 and the bared portions are passed through the channels 6 into the chamber 8 and preferably extend through said chamber into the recess 12. The bared end portions W' of the wires may then be twisted together in the manner shown in Fig. 1 by means of a suitable tool such as a pair of pliers applied to said end portions.

The connector comprises a second casing member, indicated as a whole at 14, constructed to interfit with the member 2. The member 14 consists of a closure for the recess 12 having a substantially cylindrical body 15 for engagement in said recess and a flange or rim 17 extending outwardly from said body. This closure is constructed and arranged to be forced into said recess 12 and is provided with gripping devices for gripping the end portions of the wires extending through the chamber 8 into the recess 12. This closure also is preferably made of insulating material such as Lucite and is formed with external screw threads 16 arranged to engage the internal

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screw threads 18 formed on the interior of the side wall 19 of the recess 12 to enable the closure to be screwed in the recess. The closure is provided with a series of centrally arranged gripping or clamping jaws 22 extending upwardly from the body of the closure as shown in Fig. 1 respectively in spaced relation to the axis of the closure. In the particular form of the invention shown in this application, there are two pairs of these gripping jaws, the jaws of each pair being located opposite each other. The clamping jaws are located on the closure so that, when the closure is screwed into the recess 12 in the block 2, the twisted bared end portions of the wires will be engaged in the space between the jaws. These jaws are sufficiently flexible to enable the same to be bent toward the common axis of the block 2 and the closure to grip the wires located between the same.

The closure 14 is provided with a chamber 25 to receive the extreme end portions of the bared wires extending below or beyond the gripping jaws 22 when the block 2 and the closure 14 are in relatively operative positions as shown in Fig. 3. Thus the block and the closure completely insulate the bared end portions of the wires.

The clamping jaws are so constructed and arranged that, when the closure is threaded into the recess 12 in the block 2, the upper ends of the jaws will enter the enlarged lower end of the chamber 8 and the outer faces 23 of the jaws will engage the flaring wall 10 of said chamber. These outer faces 23 of the jaws are inclined to the common axis of the block 2 and the closure. Figure 1 shows the closure threaded into the recess 12 just far enough to engage the outer or upper ends of the jaws 22 with the flaring wall 10. As the closure is threaded further into the recess, the wall 10 will act as a cam on the jaws and force the jaws toward each other to grip the twisted end portions of the wires located between them as shown in Fig. 3.

The movement of the closure 14 into the recess 12 in the block 3 is limited by suitable means before the end face 26 of the closure engages the opposed face 28 of the block 2. In the present form of the invention, the inward movement of the closure is limited by means of a ring or washer 30 interposed between the lower end, Figs. 1 and 2, of the outer wall 19 of the recess 12 and the opposed marginal flange or rim 17 on the closure 14 which extends outwardly beyond the body of the closure. This washer is preferably made in the form of a lock ring to prevent the backing off of the closure 14, when the block 2 and said closure have been located relatively in operative wire holding positions.

The washer 30 is preferably made of such a thickness that the closure executes at least a considerable portion of a turn after the wires are gripped by the jaws 22 before the movement of the closure is arrested by the washer. This final turning movement of the closure will tighten the twist of the bared end portions W' of the wires W and the jaws will hold the wires in tight contact.

This construction enables the mechanism readily to be adapted for variations in the number of wires twisted together or for variations in the sizes of the bared end portions of the wires. Of course, the larger the number of wires or the larger the diameters of the bared end portions of the wires, the larger will be the size of the twist in the assembled wires. A lock washer of a thickness corresponding with or depending upon the size of the twist in the wires will be applied to the closure 14. The larger the twist to be gripped by the wire gripping jaws, the thicker the washer employed.

Figures 4 and 5 show a closure construction which may be employed with the connector block 2 instead of the closure shown in Figures 1, 2 and 3. The closure shown in Figures 4 and 5 and indicated as 14a has substantially the same form as the closure shown in Figures 1, 2 and 3 and is constructed to cooperate in substantially the same manner with the block 2 in gripping and holding the bared ends of the circuit wires. The closure 14a is

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provided with a substantially cylindrical body 15a having external screw threads 16a arranged to engage the internal screw threads 18 in the external wall of the recess 12 and with a peripheral rim or flange 17a. The closure 14a comprises an outer portion 34 preferably made of a suitable insulating material such as Lucite and an inner portion 36 preferably made of metal having a considerable degree of flexibility and resilience such as steel. The inner portion 36 of the closure has a substantially cylindrical body 37 and diametrically arranged ribs 38 extending outwardly from the body. The outer portion 34 of the closure 14a may be moulded about the inner portion 36 to form a unitary structure.

The ribs 38 prevent the outer portion from turning with relation to the inner portion when the closure is rotated by the rotation of the outer portion to screw the closure into and out of the recess 12.

The portion 36 of the closure 14a is formed with a series of jaws 22a similar in construction and arrangement to the jaws 22 for receiving the bared ends of the wires between them. These jaws 22a, as shown, are somewhat more slender than the jaws 22 to give the same the desired degree of flexibility and are formed with inclined outer faces for engagement with the flaring wall 10 of chamber 8. The flaring wall 10 may be varied in shape to give any desired closing movements to the jaws.

The closure 14a is formed with a chamber 25a into which the extreme end portions of the stripped wires extend beyond the gripping jaws 22a.

With a closure construction such as that shown in Figs. 4 and 5, the bared end portions of the wires projecting through the chamber 8 into the recess 12 may be twisted together before the application of the closure to the block 2 or the wires may be left untwisted. When the closure is forced into the recess in the block 2 to cause the jaws 22a to grip the untwisted wires, the metallic inner portion 36 of the closure constitutes a good electrical connection between the wires.

Instead of the lock ring or washer 30, a set screw may be provided to hold the closure 14, when in operative position as shown in Fig. 3, against backing off with relation to the casing member 2. This set screw may be threaded through the wall 19 of the recess 12 and engaged with the cylindrical body 15 of the closure.

The several channels or conduits 4-6 maintain the wires in completely separated relation from the points at which they enter the member 2 of the casing substantially to the points at which the bared ends of said wires are connected within the chamber 8 by twisting the same together. The portion 37 of the block 2 between the wires, when a pull or strain is exerted on one of the wires, engages the other wire or wires adjacent the twisted together portions and acts as a stop so that the wires are forced more closely into contact at the twisted portions.

It is to be understood that, except as defined in the claims, the invention is not limited to the particular form or embodiment of the invention shown and described in this application but that the invention may be embodied in other forms within the scope of the claim.

Having explained the nature and object of the invention and having specifically described a construction embodying the invention in its preferred form, what is claimed is:

A connector for electrical circuit wires comprising two members constructed to be connected for relative rotary movement about an axis and arranged to interfit and form an enclosing insulating casing for the bared end portions of two or more separate circuit wires to be connected, one of said casing members having an interior chamber into which the said end portions of the wires are projected and means for conducting the wires to said chamber and for holding said wires from rotation with relation to the latter casing member about said axis during the relative rotation of said members, the other casing member, when interfitted with said first

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member, closing said chamber and enclosing the end portions of the wires, means for moving said casing members into operative closed relation as they are relatively rotated, relatively movable wire gripping jaws carried by the other of said casing members having a fixed location with relation thereto for gripping and forcing into firm contact the bared end portions of the wires and imparting a twist thereto to twist the wires together during the relative rotation of said casing members and means on said first casing members for moving relatively said gripping jaws to grip the wires as said casing members are moved relatively into closed relation.

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