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AUTOMATIC LINE SPLICE AND TERMINAL CONNECTOR

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Fig. 1.

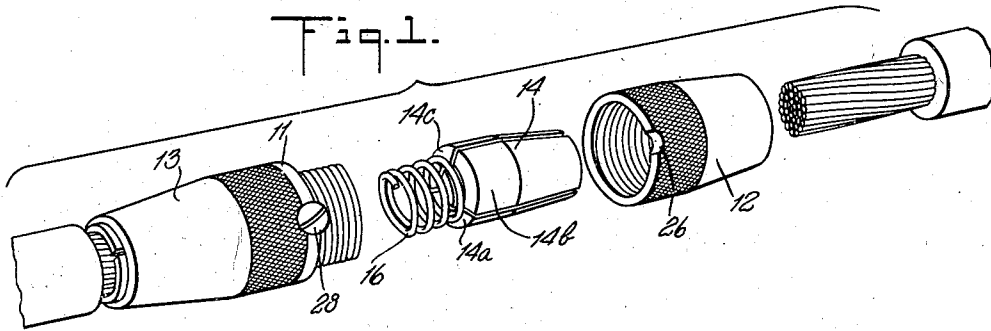


Fig. 2.

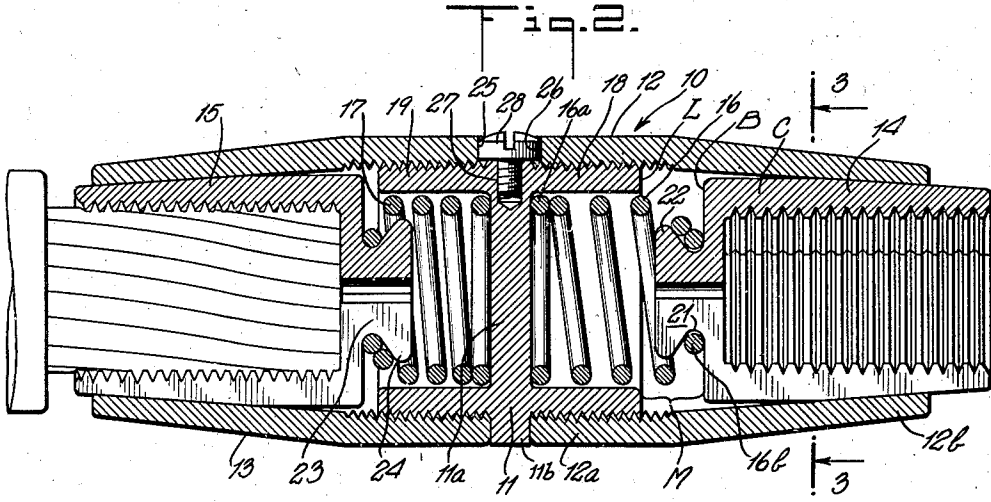


Fig. 3.

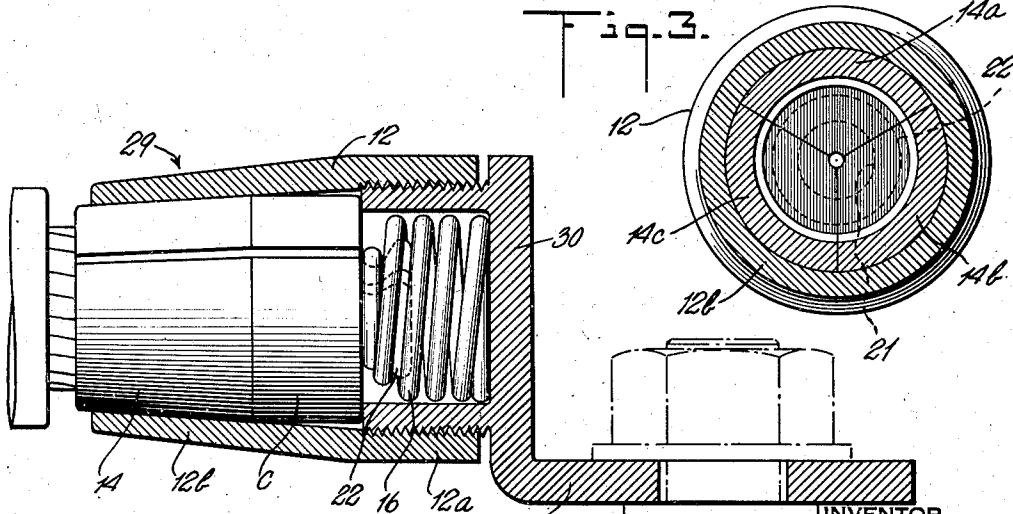
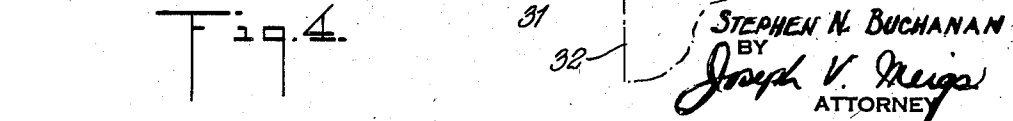


Fig. 4.



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AUTOMATIC LINE SPLICE AND TERMINAL CONNECTOR

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This invention relates to a solderless wire connector, and more particularly to an automatic line splice and terminal.

In the erection and repair of power lines, it is frequently necessary to splice the line between supporting towers, or to connect the line as by a terminal to a binding post or the like. Relatively heavy insulated cable is customarily used for high tension power lines which, because of its thickness, renders splicing or connecting, as the case may be, difficult because of the relative rigidity and weight of the cable. There have been devised, of course, various types of splices and connectors for such power cables, but many of these are characterized by such objectionable features as inapplicability to cables varying in size, difficulty of connection or disconnection to or from the cable, loss of the entire unit in the event that a portion thereof is broken, and costliness by reason of difficult manufacturing operations necessary to produce the unit.

It is accordingly among the objects of my invention to provide a line connector which overcomes such objects in addition to others.

In accordance with one form of my invention, I utilize a central bushing, closed at its central portion as by a transversely extending web, which forms with the bushing sides oppositely extending cups for the reception of springs. The outer surface of the bushing is threaded to receive tapered casings, in each of which is disposed an axially movable chuck. Each chuck is preferably provided with an inwardly extending shoulder or ring, about which the adjacent end of the spring may be attached so that upon assembly or disassembly of the connector, the chuck and spring do not become disassembled. Each of the springs biases its chuck axially outward of the connector so that the taper of the connector casing or shell tends to force the chuck jaws toward one another, thus to grip a cable end disposed within the chuck.

In the drawing, wherein I have shown a preferred form of my invention,

Figure 1 is an exploded perspective view of my connector in the form of a line splice;

Figure 2 is an enlarged vertical section of the assembled line splice;

Figure 3 is a section taken along the line 3-3 of Figure 2; and

Figure 4 illustrates my connector used as a terminal.

Similar reference characters refer to similar parts throughout the views of the drawing.

Referring first to Figure 2, the line splice, which

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is generally indicated at 10, comprises a bushing 11 and oppositely extending casings 12 and 13, within which are respectively disposed chucks 14 and 15, biased in opposite directions respectively by springs 16 and 17. Bushing 11 preferably comprises coaxial oppositely extending cups 18 and 19, which are exteriorly threaded as shown, and are connected by a web 11a which forms the bottom of the two cups and a radially extending shoulder 11b which forms a stop for the casings 12 and 13 at a point midway between the ends of bushing 11.

Cup 18 threadably receives casing 12, the cylindrical portion 12a of which is interiorly threaded. From this cylindrical portion 12a extends the tapered portion 12b of the casing, and it is in this portion that chuck 14 is disposed for axial movement relative to the casing. Chuck 14 may comprise a plurality of jaws, for example three jaws 14a, 14b and 14c (Figures 1 and 3) the ends of which preferably have the same degree of taper as casing portion 12b. Thus it follows that as chuck 14 (Figure 2) moves outwardly of casing 12, the chuck jaws close toward one another by reason of the interengagement between their tapered portions and the tapered casing portion 12b.

Spring 16, which is disposed in cup 18, preferably has a flat coil 16a adapted to seat against web 11a, and at its right-hand end is provided with a reduced coil 16b which is wound about projections extending inwardly of the chuck jaws, forming a neck 21 and shoulder 22 on the inner end of the chuck. Thus, as is more clearly shown in Figure 1, prior to assembly chuck 14 and spring 16 are loosely but securely tied together, precluding separation of the parts during any subsequent use thereof. This, of course, facilitates initial assembly of splice 10 and any subsequent use thereof which necessitates disassembly and reassembly of the splice. The inner surfaces of the chuck jaws are, as may be seen in Figure 2, suitably machined to provide circular ridges or teeth adapted to bite into the cable when the splice is assembled thereto, securely to hold the cable within the splice.

The left-hand end of splice 10 is, of course, identical to the right-hand end thereof, chuck 15 accordingly being provided with an inner neck 20 and shoulder 23 and 24 for the attachment of spring 17 thereto. Casing 13 is identical to casing 12, and chuck 15 exactly resembles chuck 14. Thus it follows that the elements comprising the two ends of the splice are readily interchangeable. It should be noted, with respect to chuck 14,

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and its casing 12, that outward movement of the chuck relative to the casing is limited only by the interengagement between the cylindrical portion C of the chuck with that portion of the casing taper 12b, whose inner diameter is the same as the outer diameter of chuck portion C. The inward movement of the chuck relative to its casing 12 is limited by the interengagement of the bottom B of the chuck with the lip L of cup 18. Thus the chuck has a range of movement M within casing 12, the length of which may be determined by the proportions of the chuck and cup 18, so that the chuck jaws are capable of relatively wide limits of expansion and contraction, thus being able to accommodate themselves and firmly to grip cable ends of various sizes. Furthermore, through the provision of this range of movement M, the splice may be quickly and automatically applied to a cable, and all that needs be done is force the cable end inwardly against the chuck, thus moving the chuck against the outward bias of spring 16 until the chuck jaws are expanded sufficiently to permit the cable end to enter the chuck and abut against its bottom. Upon release of the inward pressure of the cable end, spring 16 forces the chuck outwardly of casing 12 whose tapered portion 12b contracts the chuck jaws against the cable so that the teeth on the jaws bite into the cable. As the weight of the cable, or any other outward force exerted thereon, tends to pull the cable out of the splice, the chuck jaws are pulled with it and are further contracted by the taper of casing 12 causing the teeth in the chuck jaws to bite more firmly into the cable, and accordingly more securely attach it to the splice. By the same token, when it is desired to release the cable end from the splice, all that need be done is force the cable inwardly of casing 12, carrying the chuck jaws into the casing where they have room to expand and release the cable end. If necessary, the chuck may be momentarily retained within the casing against the bias of spring 16 by any suitable tool, so that the cable end may be readily withdrawn.

Preferably the two casings 12 and 13 are drilled as at 25 and 26, and bushing 11 is drilled and tapped as at 27 to receive a set screw 28 which holds the two casings against inadvertent disassembly from the bushing. Thus vibrations or other movements of the power line which might occur cannot unthread either casing from the bushing, and the several splice parts are securely held assembled during storage or use.

By forming splice 10 in two sections, as described, manufacturing operations thereof are relatively easy in contradistinction to the operations required to manufacture conventional splices of this general character which have unitary outer casings requiring difficult crimping and assembly operations. Furthermore, if one or more elements of one end of the splice becomes lost or damaged, its replacement is a simple matter and precludes discarding the undamaged or remaining portions of the splice.

In Figure 4, I have shown my connector in the form of a terminal, generally indicated at 29, all portions of which are the same as one end of splice 10 (Figure 2), with the exception of bushing 11. In terminal 29 (Figure 4) such bushing takes the form of a cup 30 having an angularly extending flange 31 suitably pierced for attachment to a binding post 32, or the like. Cup 30, of course, provides a recess for the reception of spring 16, and is threaded exteriorly to receive

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casing 12. The terminal chuck 14 receives and retains the cable end and also releases the cable end, as described hereinbefore, with respect to splice 10.

Thus it may be seen that I have provided a line connector which attains the several objects set forth hereinbefore in a thoroughly practical and efficient manner.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiments above set forth, it is to be understood that all matter hereinbefore set forth, or shown in the accompanying drawing, is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. An electrical connector for power lines, wires and the like, comprising a bushing having oppositely extending exteriorly threaded cup portions having a common bottom, a casing threaded on each of said cup portions forming therewith a partitioned housing, the outer ends of said casings being reduced in diameter so that said housing has tapering end portions, a chuck located in each of said tapering end portions, said chucks being adapted to grip and hold wires inserted into the open ends of said casing against outward movement, a pair of coil springs disposed in said housing on opposite sides of said partition and having the inner ends seating thereagainst for forcing said chucks outwardly of said housing, means for attaching the outer ends of said springs to the inner ends respectively of said chucks, whereby each chuck and its spring comprises a unitary assembly, and releasable means for holding said casings and cup against disassembly.

2. An electrical connector for power lines, wires, and the like, comprising an exteriorly threaded cup, a casing having an interiorly threaded cylindrical portion adapted to be threadably received on said cup, said casing having a tapered portion extending from said cylindrical portion, a plurality of gripping members mounted within the tapered portion of said casing for axial movement relative thereto, a spring within said cup engaging the inner ends of said gripping members for holding said gripping members in contact with the tapered portion of said casing, the lip of said cup providing an abutment for the inner ends of said gripping members to limit the extent of inward movement thereof, means for attaching one end of the spring to the other ends of the gripping members to form a unitary assembly thereof, and releasable means for holding said casing and cup against disassembly.

3. An electrical connector for power lines, wires, and the like, comprising a bushing having oppositely extending exteriorly threaded cup portions having a common bottom and a radially extending shoulder midway between its ends, a casing threaded on each of said cup portions forming therewith a partitioned housing, the outer ends of said casings being reduced in diameter so that said housing has tapering end portions, a chuck located in each of said tapering end portions, said chucks being adapted to grip and hold wires inserted into the open ends of said casings against outward movement, a pair of coil springs disposed in said housing on opposite sides of said partition and having the inner ends seating thereagainst for forcing said chucks outwardly of said housing means for attaching the outer ends of said springs to the inner ends

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respectively of said chucks whereby each chuck and its spring comprises a unitary assembly, and a set screw in threaded engagement with said bushing and engaging recesses provided in said casings to prevent accidental disassembly of the connector.

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