Aug. 24, 1965 E. E. LEACH 3,202,957

WIRE-CUTTING SOLDERLESS CONNECTOR

Filed April 30, 1962

FIG. 1

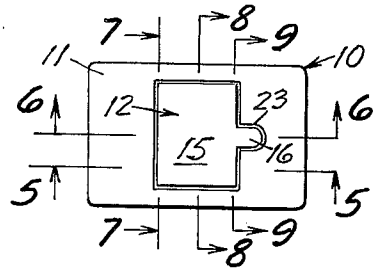


FIG. 3

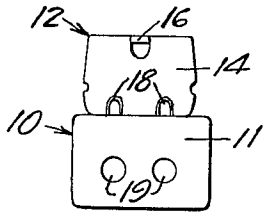


FIG. 2

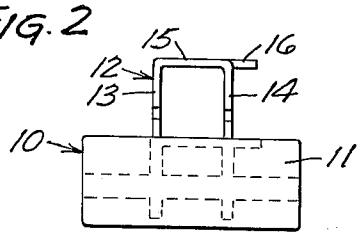


FIG. 4

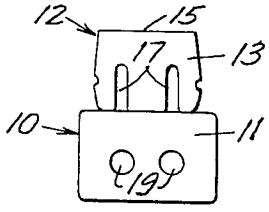


FIG. 5

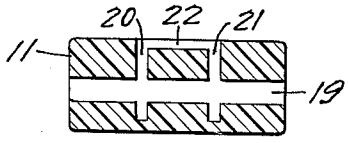


FIG. 6

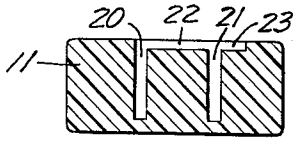


FIG. 7

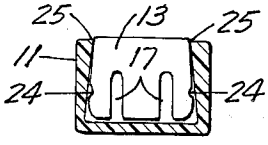


FIG. 8

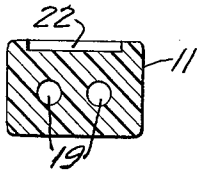


FIG. 9

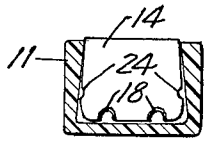


FIG. 10

FIG. 11

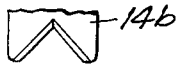


FIG. 12

FIG. 13

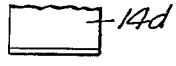
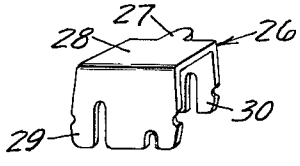


FIG. 14



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3,202,957

WIRE-CUTTING SOLDERLESS CONNECTOR

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4 Claims. (Cl. 339—98)

This invention is concerned with solderless connectors for small wires as used in communications circuits and is in the nature of an improvement over the type of connector described in U.S. Patent No. 3,012,219.

In that prior art patent there is described a connector having a channel- or U-shaped connecting element fitting into a correspondingly slotted wire-supporting base. The two legs of the U-shaped element are provided with slots in line with the wire-positions. When forced over the inserted and supported wires and into the slotted base, the slotted legs form permanent resilient conductive connection with the wires. Stripping of insulation and soldering of connection are made unnecessary.

It sometimes happens that individual wires may not be inserted into these prior art connectors to a distance sufficient to be contacted by the connecting element when the connector is crimped to form the connection; in which case the short wire pulls loose and the connection must be re-made. To conserve space within juncture boxes or the like, wire-ends are ordinarily pre-cut to minimum length required for the splice; but if not carefully measured, the wire-end may be found to be too short for convenient spilicing. Removal of surplus wire after forming the connection may leave conductive ends exposed, necessitating application of an insulating tape or cap. In all such cases, additional time is required in making an effective connection.

The present invention avoids these and other defects and deficiencies of prior art connectors and methods, and makes possible the simultaneous inter-connection of insulated small conductors and removal of undesired terminal portions of said conductors to provide a permanent well-insulated solderless joint or splice having no protruding wire-ends and with a minimum of time and effort.

In the drawing:

FIGURE 1 is a plan view and FIGURES 2, 3 and 4 are side elevation and right and left end elevations respectively (relative to the position of FIGURE 1) of a connector in open position;

FIGURES 5–9 are sectional elevations as indicated in connection with FIGURE 1;

FIGURES 10–13 are partial views of alternative wire-cutting structure; and

FIGURE 14 is a view in perspective of a connector element particularly useful in making in-line splices.

The connector **10** consists essentially of a base **11** and a connector element **12**. The base, normally of hard plastic insulating material, is provided with longitudinal tubular wire-receiving channels **19** and with channels **20**, **21** at right angles thereto for reception of legs **13** and **14** of a resilient conductive metallic connector element **12**. A recess **22** for the central plate **15** joining the legs **13** and **14**, and a recess **23** for the orienting tab **16** extending from one edge of the plate **15**, are also provided in the base **11**.

The legs **13** and **14** fit closely within the channels **20** and **21**, in the closed position shown in FIGURES 7 and 9, with a minimum of clearance at the flat sides so that wires lying within the channels **19** are fully supported at both sides of the legs.

The edges of legs **13** and **14** are slightly tapered outwardly from the plate **15** to the half-moon indentations **24** (FIGURE 7) and then slightly inwardly to the free

corners. The channels **20** and **21** likewise taper slightly away from the center-line as they increase in depth. The structure permits frictional retention of the element **12** within the base **11** when placed with the half-moon indentations at the corners **25** of the channel, while at the same time permitting unrestricted resilient spreading of the slotted leg **13** as it is forced into the channel and onto the wire conductors in completing a connection.

The opposing jaws defining the slots **17** in leg **13** of connector element **12** are substantially parallel over the inner closed portion of the slot and gradually divergent toward the outer end. The flat faces of these jaws displace the insulating covering and make firm resilient sliding contact with the metallic conductor of the wire. A permanent connection is maintained by the resiliency of the sheet metal of the plate **13**.

In contrast, plate **14** is provided with sharp beveled edges at the notches **18**, these edges being so located that they cause complete severing of the wire as the connector element **12** is forced into position within the base **11**.

Various alternative cutting edges are illustrated in FIGURES 10–13, and others will be readily apparent. The edge may be beveled on one or both sides of the plate, but an outside bevel as indicated for the notches of leg **14** is ordinarily preferred as being less likely to cause displacement of the wire-segment between the two legs **13** and **14** during the cutting action.

The connector element **26** illustrated in FIGURE 14 is particularly useful as a replacement for element **12** of FIGURES 1–4 in making line splices. The two wire-ends are inserted into the openings **19** from opposite ends of the base and pulled taut, leaving the excess wire hanging from the connector. The element **26** is then forced into place, to make permanent connection between the two conductors and simultaneously to sever the two unwanted end portions which are then discarded. The insulating plastic base conceals and protects the cut ends. No measuring, cutting or wire-stripping is involved. A permanent and well-protected connection is produced with a minimum of time and effort.

It will be appreciated that the connector element may and preferably will be provided with an insulating cap or coating; that suitable plastic sealants, e.g. silicone greases, may be placed within the connector to impart waterproofness to the connection; that the metal components may be of any suitably hard, tough and resilient metal and may be plated or otherwise finished if desired, and that various other non-inventive modifications may be included.

What is claimed is as follows:

1. A wire-connector comprising: a base having open-ended wire-receiving passages defining parallel wire-supporting surfaces, said base being doubly grooved to provide a pair of parallel grooves extending across said surfaces, each of said grooves being defined by a pair of parallel closely-spaced side walls perpendicular to said supporting surfaces and a pair of inwardly divergent end walls; and a generally U-shaped resilient conductive connector member having a first leg, a second leg, and a connecting base, each said leg being outwardly tapering from said base and indented at both edges at a common distance from said base and at an area of greatest leg width, said connector member being in position for said legs to be pressed into said grooves and said legs being of appropriate dimensions essentially to provide sliding contact with the side walls and spaced relationship with the bottom and end walls thereof, and said member being releasably retained in said position by contact between the indent surfaces of said legs and the exposed corners of said end walls; at least one of said legs

being slotted to receive and make resilient permanent contact with a wire supported on a corresponding wire-supporting surface, and the other of said legs having a corresponding cutting edge for severing a wire supported on the same wire-supporting surface.

2. The wire-connector of claim 1 in which the forward first leg of the connector member is slotted, and the rearward second leg has a cutting edge, in line with each of the parallel wire-receiving surfaces.

3. The wire-connector of claim 1 in which the first leg of the connector member is slotted in line with a first wire-receiving surface and has a cutting edge in line with a second wire-receiving surface, and the second leg conversely is slotted in line with said first surface and has a cutting edge in line with said second surface.

4. A wire-connector comprising: a base having open-ended wire-receiving passages defining parallel wire-supporting surfaces, said base being doubly grooved to provide a pair of parallel grooves extending across said surfaces, each of said grooves being defined by a pair of parallel closely-spaced side walls perpendicular to said supporting surfaces and a pair of inwardly divergent end walls; and a generally U-shaped resilient conductive connector member having a first leg, a second leg, and a connecting base, each said leg being outwardly tapering from said base to an area of greatest leg width at a

common distance from said base, said connector member being in position for said legs to be pressed into said grooves and said legs being of appropriate dimensions essentially to provide sliding contact with the side walls and spaced relationship with the bottom and end walls thereof, said base and said legs including inter-engaging retaining means at the exposed corners of said end walls and at said areas of greatest leg width for releasably retaining said connector member in said position; at least one of said legs being slotted to receive and make resilient permanent contact with a wire supported on a corresponding wire-supporting surface, and the other of said legs having a corresponding cutting edge for severing a wire supported on the same wire-supporting surface.

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