This invention relates to wire connecting tools in general, and in particular to tools for inserting a wire for conductive contact with a connector, and cutting the wire. The tool according to this invention is adapted to meet the demands of connecting a wire to a recently developed connector. The connector concerned is of a type in which contact between a wire and the connector is achieved by forcibly inserting a wire transversely into a slit between the opposing upright resilient leg members of the connector. When the wire to be connected is insulated, the wire is inserted longitudinally between the leg members of the connector to form an effective conductive contact therebetween. In case an uninsulated wire is used, the bare wire is inserted into the slit of the connector and automatically forms a conductive contact between the wire and the connector.

Conventional type tools, mostly providing for wrapping a wire around a connector to form contact between the wire and the connector, cannot be used for the type connector hereinbefore described. Therefore, it is an object of this invention to provide a novel type wire inserting and cutting tool.

Another object of this invention is to provide a novel type wire inserting and cutting tool which is simple and effective. These and other objects and advantages of the invention will appear more clearly from the following description in connection with the accompanying drawings in which:

FIGURE 1 is a perspective view of the tool according to the invention;
FIG. 2 is a side view of the upper portion of the connector to which a wire is to be connected;
FIG. 3 shows the forward end portion of the tool of FIG. 1, and a wire as it is gripped by the cutter element of the tool. The forward end portion of the tool is shown in a position to insert the wire between the leg members of the connector positioned forwardly of the tool, the connector being shown in front view;
FIG. 4 shows the final step in inserting the wire between the leg members of the connector, and cutting the wire;
FIG. 5 is a longitudinal section of FIG. 4 looking in the direction of the arrows; and
FIG. 6 is a longitudinal section of the tool shown in FIG. 1, but on a slightly smaller scale than the latter.

Referring now to the drawings, in detail the structure shown therein represents a preferred embodiment of a wire inserting and cutting tool designated 10. The tool comprises a handle 12 to which is rigidly connected a shank 14 of rectangular shape. An axially disposed rectangular recess 16 is formed in the forward end portion of shank 14 to receive and releasably house a connector 18 of the type hereinbefore described. The opposing side walls 20 of recess 16 extend forwardly thereof and are each provided at its forward end with a groove 22 (a single groove 23 intersected by recess 16), the grooves 22 positioned to cooperate with each other to receive a wire 24 to be held in a transverse blocking position relative to the recess 16 in the forward end portion of shank 14 (see FIG. 3).

Slidably mounted on the side of shank 14, in a plane normal to groove 22 adjacent one end thereof, is a cutter element 26 which is connected to a trigger 28 slidably received in a suitable housing 30 in handle 12. A spring 32 of the compression type is provided to constantly urge the trigger 28, and therewith the cutter element 26, forwardly relative to the shank 14. With this arrangement the cutter element 26 is longitudinally movable relative to the shank 14. Forward and rearward movement of the cutter element is limited by a screw 34 cooperating with the forward and rearward ends of a slot 36 formed in the rear end portion of the shank 14. Cutter element 26 is provided with a slot 38 to cooperate with two longitudinally spaced guide pins in the form of rivets 40 connected to shank 14. The heads of rivets 40 extend transversely beyond the sides of slot 38 to properly hold the cutter element in slidable engagement with shank 14. In this manner the cutter element 26 is slidably engaged to the shank 14 and longitudinally movable relative thereto.

Cutter element 26 includes a C-shaped cut-out forward end portion 42 having a cutting edge 44 formed at the rear end of the forward leg of the C-shaped cut-out end portion 42. When the tool is inoperative, the shank 14 and the cutter element 26 are positioned as shown in FIG. 1, trigger 28 and cutter element 26 connected thereto being released and urged forwardly by spring 32 to provide for the forward cut-out end portion 42 of the cutter element 26 to extend forwardly of the forward grooved ends of side wall members 20.

Operation

When a wire is to be connected to the hereinbefore described connector 18, connector 18 being positioned vertically, the tool is held in an upright position above the connector and substantially in axial alignment therewith. As shown in FIG. 3, the wire is positioned in grooves 22 and held therein by pulling the trigger 28 upwardly to slightly grip the wire between the cutting edge 44 of the cut-out forward end portion 42 of cutter element 26 and the grooves 22 in the adjacent side walls 20. The tool is then lowered to cause the connector 18 to be received in the recess 16 of shank 14. During downward movement of the tool, the wire is forced into the slit between the opposing longitudinal edges of the leg members of the connector. The cut-out is provided for, to provide for a portion of the wire to be captured by the grooves 22 in the adjacent side walls 20. The tool is then lowered to cause the connector 18 to be inserted into the recess 16 of the connector, causing cutter element 26 at this instant to remain stationary while the shank 14 and wire 24 continue to move downwardly. The wire 24 is forced against the cutting edge 44 of the stationary cutting element 26 and further into the slit of the connector, a portion of the free end of the wire to be sheared by the cutting edge 44 of the cutter element 26. When the tool is in a position as shown in FIGS. 4 and 5, the wire is held resiliently but firmly clamped in the slit between the leg members of the connector while the free end of the wire is neatly sheared and extending only slightly from the cutter element. The tool is then retracted, spring 32 urging cutter element 26 forwardly into its normal original position as shown in FIG. 1, to be prepared for the next insert operation.

A specific feature of the tool is illustrated in FIG. 5. When the wire is being forced downwardly between the leg members of the connector, the leg members of the connector are urged to bend outwardly. In order to prevent excessive outward bending of the leg members, possibly causing permanent deformation of the leg members of the connector, the front and rear walls 46 of recess 16 in the shank 14 are positioned such to provide for a sliding engagement between the leg members of the con-
nector and the walls 48 of recess 16 during the insert operations. With this arrangement the leg members of the connector are prevented from bending outwardly beyond a predetermined distance.

It is apparent from the above description that a novel and simple tool has been provided to produce an effective and fast conductive contact between a wire and the associated connector.

It is to be understood that the present invention is not limited to the particular structure and arrangement shown and described, but also includes any modifications within the scope of the appended claims.

I claim:

1. A tool comprising:
   (a) a supporting member having an open end recess 16 in one end thereof to receive and releasably house a connector with a wire extending therethrough, and a groove in the one end for receiving the wire;
   (b) a cutting member having an opening in one end thereof for passing an end to be cut of the wire, and a cutting edge adjacent the opening;
   (c) the members being connected and reciprocal to one another;
   (d) means for biasing the members relative to one another to position the opening and cutting edge beyond the one end of the supporting member; and
   (e) means for moving the members relative to one another against the biasing means moving the cutting edge across the one end of the supporting member and through the wire in the opening for cutting.

2. A tool comprising:
   (a) a supporting member having an open end recess 16 in one end thereof to receive and releasably house a connector with a wire extending therethrough, and a groove in the one end intersected by the recess for supporting the wire;
   (b) a cutting member having an opening in one end thereof for passing an end to be cut of the wire, and a cutting edge adjacent the opening;
   (c) the members being connected and reciprocal to one another;
   (d) means for biasing the members relative to one another to position the opening and cutting edge beyond the one end of the supporting member; and
   (e) means for moving the members relative to one another against the biasing means moving the cutting edge across the one end of the supporting member and through the wire in the opening for cutting.

3. A tool comprising:
   (a) a supporting member having an open end recess 16 in one end thereof to receive and releasably house a connector with a wire extending therethrough, and a groove in the one end intersected by the recess for supporting the wire;
   (b) a cutting member having an opening in one end thereof for passing an end to be cut of the wire, and a cutting edge adjacent the opening disposed in a plane normal to the groove and adjacent one end thereof;
   (c) the members being connected and reciprocal to one another;
   (d) means for biasing the members relative to one another to position the opening and cutting edge by the one end of the supporting member; and
   (e) means for moving the members relative to one another against the biasing means moving the cutting edge across the one end of the supporting member and through the wire in the opening for cutting.

4. A tool comprising:
   (a) a supporting member having a surface at one end with an axially disposed recess for receiving and releasably housing a split connector;
   (b) the end surface having a groove intersected by the recess for supporting a wire inserted into the split connector as it is received in the recess;
   (c) a cutting member having an opening in one end for passing one end to be cut of the wire, and a cutting edge adjacent the opening;
   (d) the members being connected to one another for reciprocation therewith;
   (e) means biasing the members relative to one another urging the cutting edge beyond the end surface of the supporting member and through the end to be cut of the wire.

5. A tool comprising:
   (a) a supporting member having a surface at one end with an axially disposed recess for receiving and releasably housing a split connector;
   (b) the end surface having a groove intersected by the recess for supporting a wire inserted into the split connector as it is received in the recess;
   (c) a cutting member having an opening in one end for passing one end to be cut of the wire, and a cutting edge providing one side of the opening being disposed in a plane normal to the groove and adjacent one end thereof;
   (d) the members being connected to one another for reciprocation therewith;
   (e) means biasing themembers relative to one another urging the cutting edge beyond the end surface of the supporting member and through the end to be cut of the wire.

6. A tool comprising:
   (a) a supporting member having a surface at one end with an axially disposed recess for receiving and releasably housing a split connector, and means spaced from the surface for gripping and holding the tool;
   (b) the end surface having a groove intersected by the recess for supporting a wire inserted into the split connector as it is received in the recess;
   (c) a cutting member movably connected to the supporting member having an opening in one end for passing one end to be cut of the wire, and a cutting edge adjacent the opening for cutting such wire end;
   (d) the cutting member having means movable relative to the gripping means for moving the cutting edge from a position beyond the end surface of the supporting member across the end of the groove and through the wire; and
   (e) means for biasing the cutting member to move the cutting edge to its position beyond the end surface of the supporting means.

7. A tool comprising:
   (a) a supporting member having a surface at one end with an axially disposed recess for receiving and releasably housing a split connector, and means spaced from the surface for gripping and holding the tool;
   (b) the end surface having a groove intersected by the recess for supporting a wire inserted into the split connector as it is received in the recess;
   (c) a cutting member movably connected to the supporting member in a plane normal to the groove and adjacent one end thereof, and having an opening in one end for passing an end to be cut of the wire;
   (d) the cutting member having a cutting edge adjacent the opening and means movable relative to the gripping means for moving the cutting edge from a position beyond the end surface of the supporting member across the end of the groove and through the wire; and
   (e) means for biasing the cutting member to move the cutting edge to its position beyond the end surface of the supporting means.
8. A tool comprising:
(a) a supporting member having a surface at one end with an axially disposed recess for receiving and releasably housing a split connector, and means spaced from the surface for gripping and holding the tool;
(b) the end surface having a groove intersected by the recess for supporting a wire inserted into the split connector as it is received in the recess;
(c) a cutting member movably connected to the supporting member having an opening in one end with one side open for passing one end to be cut of the wire, and a cutting edge forming a side of the opening adjacent the open side thereof for cutting such wire end;
(d) the cutting member having means movable relative to the gripping means for moving the cutting edge from a position beyond the end surface of the supporting member across the end of the groove and through the wire; and
(e) means for biasing the cutting member to move the cutting edge to its position beyond the end surface of the supporting means.

References Cited by the Examiner

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Date</th>
<th>Inventor</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>502,386</td>
<td>8/93</td>
<td>Scheffer</td>
<td>30—184</td>
</tr>
<tr>
<td>2,518,489</td>
<td>8/50</td>
<td>Orlando</td>
<td>339—97</td>
</tr>
<tr>
<td>2,651,768</td>
<td>9/53</td>
<td>Oortgijen</td>
<td>7—14.1 X</td>
</tr>
<tr>
<td>2,856,686</td>
<td>10/58</td>
<td>Stanley</td>
<td>30—131</td>
</tr>
<tr>
<td>2,985,958</td>
<td>5/61</td>
<td>Freeman</td>
<td>30—182</td>
</tr>
</tbody>
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