May 28, 1957 W. A. BARNES 2,794,176

TERMINAL CONSTRUCTION

Filed May 21, 1953

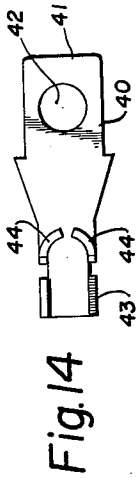


Fig.14

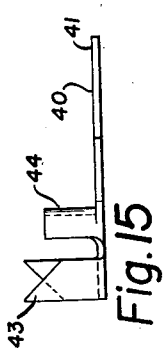


Fig.15

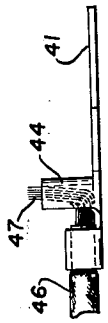


Fig.16

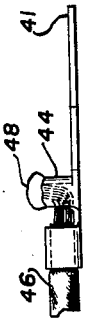


Fig.17

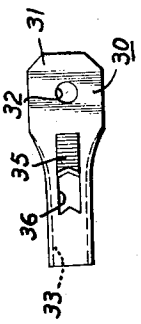


Fig.9

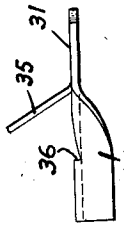


Fig.10

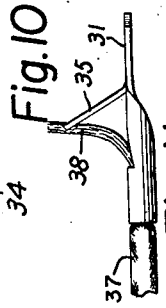


Fig.11



Fig.12

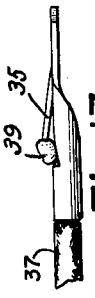


Fig.13

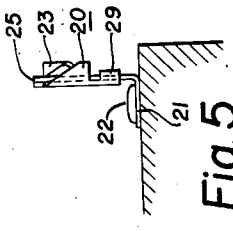


Fig.5

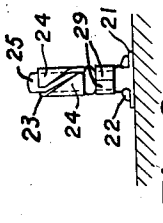


Fig.6

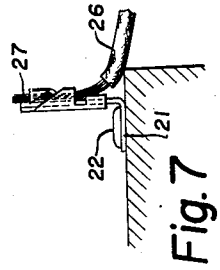


Fig.7

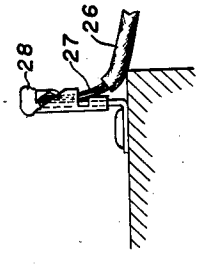


Fig.8

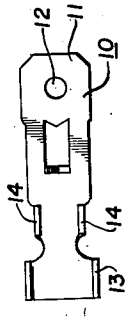


Fig.1

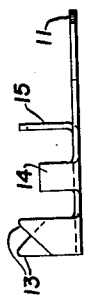


Fig.2

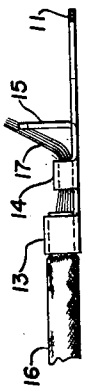


Fig.3

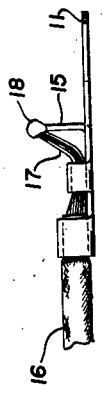


Fig.4

INVENTOR.
WILLIAM A. BARNES
BY Woodling and Krost
attys

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2,794,176

TERMINAL CONSTRUCTION

William A. Barnes, Utica, N. Y., assignor to Utica Drop Forge & Tool Corporation

Application May 21, 1953, Serial No. 356,490

5 Claims. (Cl. 339—275)

This invention relates in general to terminal construction for electrical conductor wires, and relates more particularly to terminal constructions having a union portion located in position for tip welding to a wire conductor.

An object of this invention is to provide an improved terminal member construction for electrical conductor wires.

Another object of this invention is to provide an improved terminal member construction particularly adapted for arc tip welding of the terminal to a conductor wire.

Still another object of this invention is to provide such terminal with temporary holding and guiding means for a wire conductor to properly position the wire with respect to a union portion of the terminal until permanently united therewith.

Other objects and a fuller understanding of this invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a plan view of one type of terminal construction made according to the principles of this invention;

Figure 2 is a side elevation of the terminal of Figure 1;

Figure 3 is a view of a wire mechanically engaged in the terminal and positioned for electrical union therewith;

Figure 4 is an illustration of the finished union, both electrical and mechanical, between the wire and terminal;

Figure 5 is a side view of a terminal construction made according to the principles of this invention;

Figure 6 is a front view of the terminal of Figure 5;

Figure 7 is a side view of the terminal with a wire conductor mechanically held therein;

Figure 8 is a side view similar to Figure 7, but with the wire and terminal welded together;

Figure 9 is a plan view of another type of terminal construction made according to the principles of this invention;

Figure 10 is a side view of this embodiment;

Figure 11 is the side view with a wire mechanically held therein;

Figure 12 is the side view with this wire and terminal welded together;

Figure 13 is the side view with the union welded members bent down upon the terminal body;

Figure 14 is a plan view of still another type of terminal construction made according to the principles of this invention;

Figure 15 is a side view of this embodiment;

Figure 16 is the side view with the wire and terminal mechanically joined; and

Figure 17 is the side view with the wire and terminal welded together.

The invention of this application is suited for a soldering union of conductor and terminal, but the primary intent and purpose is for use with tip-welding methods as

set forth in application Serial No. 318,303, filed November 1, 1952.

According to this invention, the conducting wire and a small union portion of a terminal member are held in close proximity in a position remote from the body of the terminal. The terminal and wire are then grounded and an electrode member of opposite polarity is advanced rapidly toward the area of the conducting members to be united. An arc is produced between the electrode and the weldable members and causes the weldable members to rapidly rise to the melting point and begin to melt. If the welding potential is provided in sufficient intensity, then melting will be rapid enough to cause the weldable members to melt into a ball and recede before the face of the advancing electrode. This receding action will be fast enough to increase the distance between the weldable members and the electrode member beyond the arcing distance and, consequently, will extinguish the arc. Formed conducting members will retract as they melt because a spherical form will contain more material for a given surface area than the shaped articles.

Although this invention has found particular utility with aluminum wire and copper terminals, it has been found to be quite successful with other materials of opposite or similar characteristics.

There are four species of the invention illustrated in the drawings, each embodying the general basic principles of the invention.

Figure 1 of the drawing is a plan view of a terminal **10** having an anchor end **11** lying in a plane and adapted for mechanical union to any electrical equipment by the provision of a suitable hole **12** therethrough to receive an attachment screw. The terminal **10** is provided with a first set of deformable wire clamp tabs **13** to mechanically grip a conducting wire **16**, preferably over the insulation of the wire **16**. A second set of deformable tabs **14** is provided to grip the wire, preferably around the bare strands **17**. The tabs **13** and **14** are illustrated as being integrally formed from the body of the terminal **10** and are deformable in the usual manner upon the wire to provide a mechanical grip.

As thus far described, the terminal **10** does not differ considerably from the usual mechanical grip type of terminal. However, there is provided a union member portion **15** which is punched from the body of the terminal and, extends in an upright position, as viewed in Figure 2. Inasmuch as the anchor end is said to lie in a plane, it may properly be said that the union portion extends at an angle with respect to that plane.

Prior to mechanically joining the wire to the terminal member, it may be that the deformable tabs **13** and **14** will extend as far, or further, in a lateral direction with respect to the plane of the anchor than the union member portion **15**, but after having been clamped upon the wire **16**, the union member portion **15** extends to a terminus beyond all other portions of the terminal body. Therefore, the union member stands apart and is readily accessible for the improved tip weld type of union. In Figure 4 the weld is shown completed and the weld is referred to by the reference character **18**. A perfect electrical union is thereby provided between the conducting member and terminal. This union is made possible by constructing the terminal member according to the principles of this invention.

In Figure 5 of the drawing there is illustrated a second embodiment of the invention. This embodiment comprises a terminal **20** having an anchor end **21**. The anchor end **21** again defines a plane and is securable to an electrical apparatus by means of a screw **22**. A union end **25** is formed integrally with the anchor end **21** and is positioned at an angle with respect to the plane of the anchor end. A separate anchor member **23** for the conductor **26**

is mechanically secured to the union member **25** by means of deformable tabs **29**. The anchor member **23** is essentially an elongated strip with several lateral tab portions. The strip can therefore be primarily held onto the union end by gripping the deformable tabs **29** upon this union end. Thereafter, the balance of the tabs can then be employed as gripping members. The anchor member **23** thus has a base portion which fits against a surface of the union member, and the tabs encompass the union end **25** and provide a mechanical grip to unite the two members **23** and **25** in a good mechanical bond. The anchor member is also provided with deformable tabs **24** to grip the uninsulated portion of a wire **26** and hold the wire with the bare strands **27** thereof extending upwardly along the union end **25**, as illustrated best in Figure 7. The tabs **24** are spaced apart in order that the wire may be placed into the position illustrated in Figure 7 by slipping the wire between the tabs. Furthermore, whenever the tabs **24** are tightened upon the wire **26**, they aid in further holding the anchor member **23** and the union end **25** together in a tight mechanical bond. The anchor member **23** is primarily provided for the purpose of securing the wire **26** to the terminal and absorbing any mechanical forces against the wire-terminal union in preference to absorption at the point of the weld.

It is to be noted that the union member **25** extends to an unobstructed terminus and is therefore readily accessible for tip-welding procedure. There is nothing in this arrangement which will obstruct free movement of a tip-welding electrode toward the strands **27** and the terminus of the union end **25** to form the weld, illustrated by the reference character **28** in Figure 8.

A still further embodiment of the invention is illustrated by the reference character **30**. This terminal **30** has the anchor end, illustrated by the reference character **31**, extending in a plane and adapted for mechanical union to an electrical apparatus by means of a hole **32** for accepting a fastening screw.

The terminal **30** is provided with a channel section **33** opening to one side of the plane of the anchor end **31** therefore providing the preferred deformable tabs for anchoring to a conducting wire **37**.

Intermediate the anchor end **31** and the channel section **33** is an intermediate portion **34**. A union member **35** is cut from the intermediate portion and is bent at an angle with respect to the plane of the anchor end **31** in order to present the desired terminus remote from the body of the terminal. The union member **35** extends in a direction opposite from the opening of the channel **33**; and accordingly, the wire **37** may be gripped by deformation of the channel portion **33** and the strands **38** thereof fed through the hole **36** which resulted from cutting of the union member **35**. The strands **38** of wire **37** are thus mechanically held in contact with the union member **35** prior to applying the tip-weld action to produce the finished weld **39**.

In this particular modification of the invention, the union member is illustrated as being bent down upon the body of the terminal after the weld **39** has been produced. (See Figure 13 of the drawing.)

A fourth embodiment of the invention is indicated by the reference character **40** in Figure 14 of the drawing. This terminal **40** has an anchor end **41** which lies in a plane and is provided with a hole **42** for mechanical union to an electrical apparatus.

Deformable tabs **43** are provided in a manner similar to that illustrated in Figure 1 of the drawings for mechanical gripping of the insulated portion of a conducting wire **46**.

In the embodiment of the terminal **40**, the temporary alignment of the strands **47** of wire **46** is provided by tabs **44**. Tabs **44** are provided by severing all but a small portion of the tabs from the body of the terminal and then bending the tabs inwardly as illustrated best in

Figure 14 of the drawing. The strands then are forced into the semicircular area defined by the tabs **44** and are thus securely held in position against the tabs until the tip weld action can be carried out to produce a weld **48** and bind the strands of the wire **46** and the terminal **40** in good electrical union.

The invention may be broadly said to comprise a body member wherein the anchor end lies in a plane and is adapted for mechanical union to a body such as a suitable electrical apparatus, and to incorporate a deformable wire clamp portion to mechanically grip a conductor wire and prevent transmission of mechanical shocks to the weld between the wire and the terminal, and to also include a union portion which is preferably integrally formed with the anchor end and is extended at an angle with respect to the plane of the anchor portion to a terminus beyond all other portions of the terminal body when clamped to a conductor wire.

Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. A terminal member adapted for fused union with a conductor wire, comprising, a terminal body having an anchor portion adapted for mechanical union to a body, a deformable wire clamp portion separate from said anchor portion adapted to mechanically grip a conductor wire, and a union portion, said union portion extending as a spur to a terminus beyond all other portions of the terminal body where it is accessible to a tool for causing fusion, said wire clamp portion adapted to hold a wire directed toward said union portion.

2. A terminal member adapted for fused union with a conductor wire, comprising, a terminal body having an anchor end lying in a plane and adapted for mechanical union to a body, a first deformable wire clamp portion separate from said anchor portion adapted to mechanically grip a conductor wire, a second deformable wire clamp portion separate from said anchor portion adapted to mechanically grip a conductor wire, said first and second wire clamp portions longitudinally spaced and aligned to define a wire clamp path substantially parallel to the plane of said anchor end, and a union portion, said union portion extending as a spur to a terminus beyond all other portions of the terminal body where it is accessible to a tool for causing fusion, said wire clamp portion adapted to hold a wire directed toward said union portion.

3. A terminal member adapted for fused union with a conductor wire, comprising, a terminal body having an anchor end lying in a plane and adapted for mechanical union to a body, a deformable wire clamp portion to mechanically grip a conductor wire, and a union portion, said clamp portion defining a wire clamp path at an angle to the plane of said anchor end, said union portion extending in a path substantially parallel to the wire clamp path to a terminus beyond the clamp portion and therefor extending beyond all other portions of the terminal body.

4. A terminal member adapted for fused union with a conductor wire, comprising, a terminal body having an anchor end adapted for mechanical union to a body, a deformable wire clamp portion separate from said anchor portion adapted to mechanically grip a conductor wire, and a union portion, said union portion comprising a strip portion partially cut from the terminal body to provide integral connection of the union portion and terminal body, and to provide a guide hole through the body to act as a wire guide, said union portion bent into a position extending as a spur to a terminus beyond all other portions of the terminal body, said union portion

being deflectable toward the body of the terminal after being united with a wire to thereby produce a compact construction.

5. A terminal member adapted for fused union with a conductor wire, comprising, a terminal body having an anchor end lying in a plane and adapted for mechanical union to a body, a deformable wire clamp portion separate from said anchor portion adapted to mechanically grip a conductor wire, and a union portion, said union portion comprising a generally semicircular wall extending laterally from the plane of said anchor end between said anchor end and said wire clamp portion.

References Cited in the file of this patent

UNITED STATES PATENTS

2,175,251	Carson	Oct. 10, 1939
2,377,187	Schey	May 29, 1945
2,483,424	Martines	Oct. 4, 1949