FIP8009 OR 2,411,838 Search Room

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5-726

Nov. 26, 1946. R. C. SWENGEL 2,411,838

TOOL

Filed Feb. 5, 1944

Fig. 1.

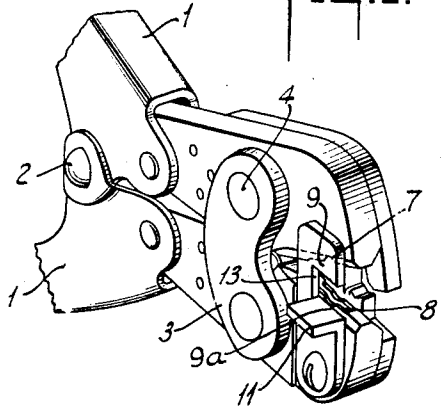


Fig. 2.

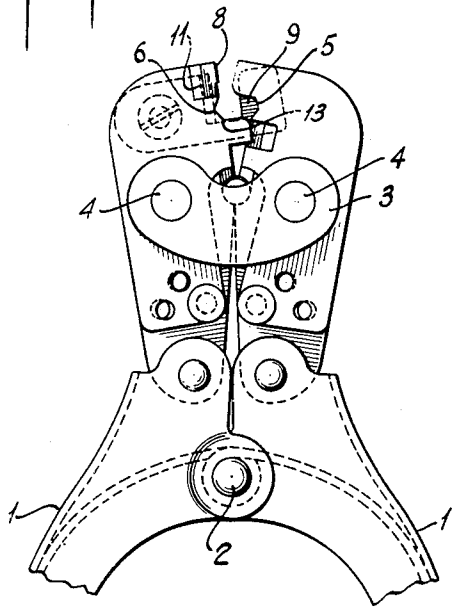


Fig. 3.

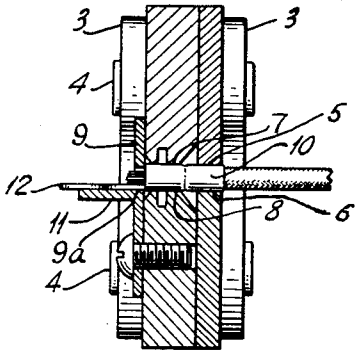


Fig. 4.

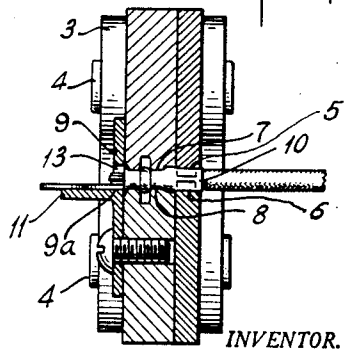
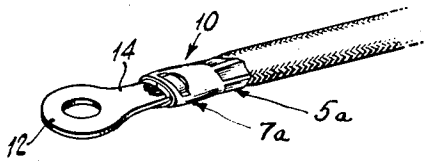


Fig. 5.



INVENTOR.
ROBERT C. SWENGEL.
BY
Blair, Curtis + Hayward
ATTORNEYS.

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2,411,838

TOOL

Robert C. Swengel, Harrisburg, Pa., assignor to Aircraft-Marine Products, Inc., Harrisburg, Pa., a corporation of Pennsylvania

Application February 5, 1944, Serial No. 521,219

3 Claims. (Cl. 81—15)

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The present invention relates to an improvement in crimping tools, more particularly to a type employed in securing terminal pieces to end portions of electrical conductors, as wires, cables, or the like, without the use of solder and by crimping or pressing the ferrule portion of a terminal around said end portions of the wire.

A known form of manually operated crimping tool for this purpose provides two sets of crimping dies, one set for crimping a part of the ferrule around an insulated portion or sheath of the wire, and the other set for coining another part of the ferrule directly upon a portion of the metal core which has been stripped of its insulation or sheath. Such a tool is described in Patent No. 2,359,083 to Vernon E. Carlson.

In using said tool, the dies of which are normally biased to open position, the wire end initially assembled with the ferrule portion of the terminal to be secured thereto, is brought between the dies of said sets. That part of the ferrule which embraces the sheath is crimped thereon by the set of diamond crimping dies; and another part of the ferrule embracing the bare core is crimped thereon and materially deformed by the set of coining dies which also impart corresponding deformations to the core. This manner of ferrule crimping produces a desirably secure and low resistance connection between the terminal and the wire. However, the coining produces an elongation of the ferrule, and this has made it difficult to design jigs for locating the ferrule relative to the dies, in particular necessitating use of springs to absorb such elongation and prevent the terminal from jamming between the dies and the jig. Moreover, a different jig is required for each terminal. Where different terminal ends are being connected to the same size wire this unnecessarily multiplies the number of tools required.

One object of the present invention has been to provide a crimping tool which may be employed to produce the combined diamond crimp and ferrule coining on different types of terminals without jamming in the tool. Another object has been to provide such a tool with devices by which the terminal may be more quickly and accurately inserted in the tool in position to be crimped into secure engagement with the wire end. Where the terminal employed comprises a ferrule and an attaching tongue, as is usual, a further object has been to utilize the tongue in quickly and effectively positioning the ferrule for crimping in the crimping tool. A

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further object has been to provide a crimping tool having the advantageous features above referred to and which is simple and rugged and inexpensive to make.

In this specification and the accompanying drawing, I have shown and described a preferred embodiment of my invention and various modifications thereof; but it is to be understood that these are not intended to be exhaustive nor limiting of the invention, but on the contrary are given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify and adapt it in various forms, each as may be best suited to the conditions of a particular use.

In the accompanying drawing, in which a satisfactory form of crimping tool embodying the invention for achieving the above objectives is set forth:

Figure 1 is a view in perspective, with handle portions omitted;

Figure 2, a side elevation of the parts shown in Figure 1;

Figure 3, a sectional view through the center of the dies showing the crimping dies, the ferrule guide plate, and a terminal with its ferrule in operative position to be crimped by said dies on the end of a wire;

Figure 4 is a view similar to Figure 3 but showing the tool and ferrule at the end of the crimping operation; and

Figure 5, a view in perspective of a terminal secured by crimping on the end of a wire.

The crimping tool illustrated in the drawing comprises opposed die carrying jaws pivoted to a pair of handle grips 1 which are themselves pivoted at 2 and normally biased to extended or open position. Tie plates 3 are pivoted to the jaws at 4, so that said jaws can fulcrum against each other when acted upon by the handles. The outer ends of said jaws carry sets of crimping dies, one set being the opposed diamond crimping dies at 5 and 6 and the other set being the opposed coining dies 7 and 8.

A guide plate provided with a slot open at one end and secured at one side of die 8 has a stop portion 9 adjacent to the path of crimping movement of die 7 toward die 8, and against which one end of ferrule 10, Figure 3, abuts when positioned in the tool for crimping. One side or edge 9a of said slot opposite stop portion 9 and a shelf or flange 11 projecting laterally therefrom, by engaging the tongue 12 when in crimp-

ing position, predetermine the angular relation of the crimps formed in the ferrule to said tongue. Or, said edge 9a alone and without flange 11, may serve the same purpose by engaging and properly positioning the base portion 14 of tongue 12. The closed end 13 of the slot serves at the same time as a stop to position the ferrule in coaxial relation to the dies by engaging the side of the tongue 12 when the terminal is inserted in the tool for crimping.

The clearance between the jaws adjacent crimping dies 5 and 6 when in normal open relation is such that a ferrule of appropriate size is properly inserted endwise from the right, Figure 3, and moved to the position there shown. The ferrule is stopped at this proper position by the edge of the ferrule 10 abutting the stop 9.

As the jaws come together in crimping, the diamond crimp dies 5 and 6 effect a constricting grip indicated at 5a (see Figure 5) on that portion of the ferrule engaged by them while the coining dies 7 and 8 partially flatten and appropriately deform that other portion of the ferrule engaged by them as indicated at 7a in Figure 5. A progressive elongation of the ferrule is thereby produced which could cause jamming of the coined portion between the dies and the interior guide face or stop 9, except that the effective extent of said stop where it engages the ferrule 10 is such that when said ferrule is flattened by initial compression between dies 7 and 8, it is pushed below the edge of and thus disengaged from said stop 9 and may therefore be further deformed without jamming as the crimping and coining are completed.

One effect of crimping and coining is to flatten the ferrule toward an axial plane parallel with the plane of tongue 12, so that the wire end with a terminal secured thereon may be freely and easily disengaged from the tool and pulled out through the end when the dies are returned to normal open position. In the form shown, this mode of removal is facilitated by the provision of said slot in the guide plate with its open end adjacent to the open end of the jaws.

I claim:

1. In a crimping tool for securing a terminal having a ferrule to a wire or the like, the combination with a pair of jaws movable one toward the other and defining a forming recess therebetween and each being provided with a ferrule-coining die portion in opposed relation to a corresponding die portion of the other, of a ferrule positioning guide plate supported by one of said jaws and having a ferrule engaging stop portion arranged in laterally overlapping relation to said forming recess; said stop portion having an edge substantially parallel to and spaced from the die portion of the supporting jaw by an amount slightly less than the over-all cross-sectional height of a ferrule to be crimped.

2. In a crimping tool for securing a terminal having a ferrule to a wire or the like, the combination of a pair of jaws movable one toward the other and defining a forming recess therebetween and each being provided with a ferrule-coining die portion in opposed relation to a die portion of the other, and a guide plate secured to one of said jaws and provided with a slot open at one end and closed at the other; a first edge of said slot being substantially flush with the most recessed die portion of the jaw to which said guide plate is attached and a second edge of said slot being spaced from said first edge by an amount slightly less than the over-all cross-sectional height of a ferrule to be crimped.

3. In a crimping tool for securing a terminal having a ferrule to a wire or the like, the combination of a pair of jaws movable one toward the other and defining a forming recess therebetween and each being provided with a ferrule-coining die portion in opposed relation to a die portion of the other, and a guide plate secured to one of said jaws and provided with a slot open at one end and closed at the other; a first edge of said slot being substantially flush with the most recessed die portion of the jaw to which said guide plate is attached and a second edge of said slot being spaced from said first edge by an amount slightly less than the over-all cross-sectional height of a ferrule to be crimped, and said closed end of said slot being arranged with respect to said forming recess to provide an abutment for positioning the terminal in proper axial relation to the dies.

ROBERT C. SWENGEL.