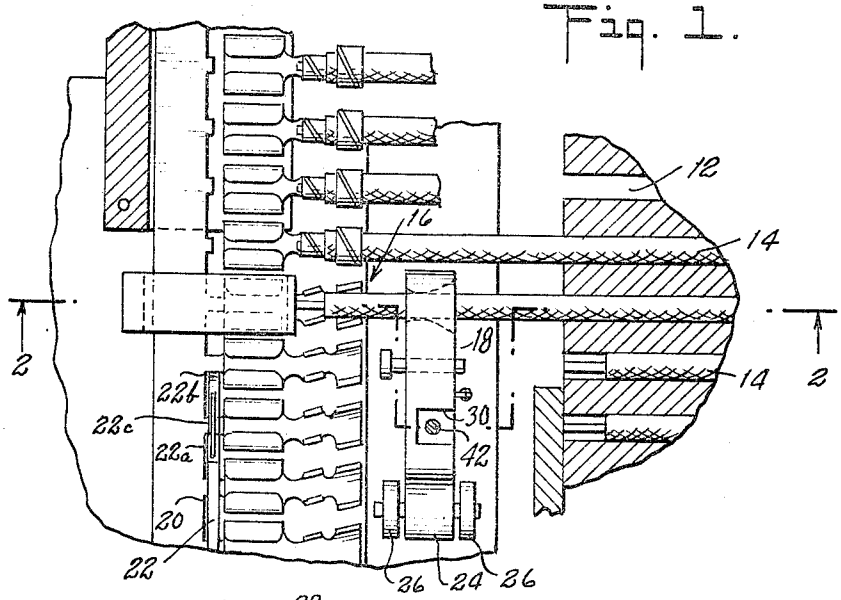
Aug. 9, 1966 P. J. HERB 3,264,860

WIRE GUIDES FOR TERMINAL ATTACHING MACHINES

Filed Feb. 3, 1964

Fig. 1.



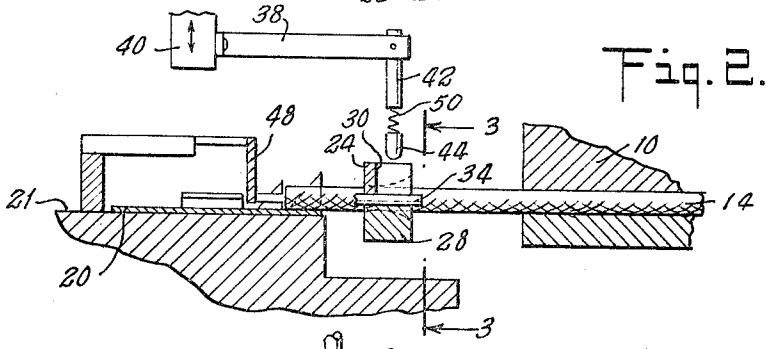


Fig. 2.

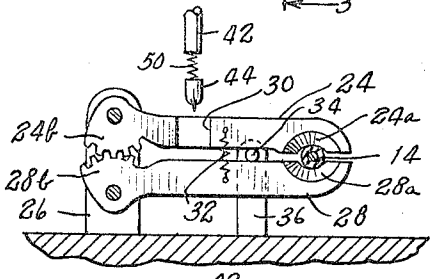


Fig. 3.

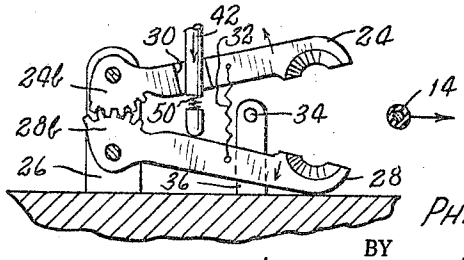


Fig. 4.

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WIRE GUIDES FOR TERMINAL ATTACHING MACHINES

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The present invention relates to improvements in terminal attaching machines and more particularly to an improved wire guide for terminal attaching machines which receives the end of the wire to which a terminal is to be attached and guides it correctly into the attaching position in the terminal attaching machine and which provides for the easy removal of the wire after the terminal attaching operation has been completed.

In standard terminal attaching machines such as that illustrated in co-pending application S.N. 287,881, a strip of terminals is fed by an indexing pawl along a flat surface until the terminal still attached to the strip is crimped onto a lead of a wire by a ram having attached to it a terminal crimping tool and a cutoff blade. When the ram descends, the terminal crimping tool causes a terminal to be crimped on to the wire and insulation while at the same time cutting off the terminal crimped on the wire lead from the strip of terminals. As described in our co-pending application, a wire handling device which operates in synchronism with the terminal attaching machine feeds a wire to the terminal attaching station for each reciprocating cycle of the ram of the terminal attaching machine. In order to properly position the wire to which a terminal is to be attached, a wire guide is provided. The wire guide described and shown in our co-pending application comprised an upper plate having a converging slot milled in its underside which was pivotally mounted and held in its normal position by a leaf spring and a bottom leaf spring mounted on the lower side of the plate which tended to close the converging slot formed in the underside of the plate.

In the automatic wire handling device of our co-pending application, a feed drum would advance a wire to be crimped to a position adjacent to and opposite the wire guide. Thereupon a feed mechanism would cause the wire to be fed into the wire guide which would properly position the lead of the wire for attaching of a terminal. After a terminal had been attached, the feed drum would carry the wire past the terminal attaching position pulling the wire out of the wire guide. Removal of the wire from the wire guide was also aided by the ejection lip of a feed pawl which indexed the strip of terminals to be crimped onto the wires. This latter method of removal of the wire from the wire guide after the terminal crimping operation has proven largely unsatisfactory since often times the insulation on the wire was damaged in removal from the wire guide and at times the wire would not be completely removed from the guide and would tend to entangle with the next wire to be crimped.

It is thus an object of this invention to provide a means for properly positioning a wire with respect to a terminal attaching machine so that a terminal will be correctly attached to each wire.

It is a further object of this invention to provide for means in a terminal attaching machine to properly position a wire for attaching of a terminal while providing for easy removal of said wire from the terminal attaching position after the terminal attaching operation.

With these and other objects and advantages in mind, the device of this invention will be better understood by considering the description of elements set forth below along with the drawings in which:

FIG. 1 is a fragmentary horizontal sectional view of a portion of the terminal attaching machine and the automatic wire handling device including the wire guide of the present invention.

FIG. 2 is a fragmentary vertical section view taken along line 2—2 in FIG. 1 and showing a wire positioned with respect to a terminal prior to being attached thereto.

FIG. 3 is a fragmentary vertical section view taken along line 3 of FIG. 2 and showing the wire guide of the present invention in a closed position.

FIG. 4 is a fragmentary vertical section view showing the wire guide of FIG. 3 after a terminal has been attached to the wire and the wire guide is in its open position.

In the fragmentary view shown in FIG. 1, only the portions of the automatic wire handling device and terminal attaching machine are shown which are needed to explain the present invention. The portion of the automatic handling machine on the right shows a fragment of a feed drum **10** provided with slots **12** carrying wires **14** which are to have terminals attached to their lead ends. Feed drum **10** carries a wire **14** to a position in alignment with terminal attaching position **16**. At this point a feed wheel (not shown) feeds a wire **14** into a wire guide generally denoted as **18**, wire guide **18** positioning the wire for correct attachment of a terminal. A strip of terminals **20** is indexed along surface **21** so as to position an individual terminal **20** at the terminal attaching position **16** at the time an individual wire **14** is fed into the terminal attaching position **16**. Terminal strip **20** is indexed by the action of an indexing pawl **22** attached to a cam mechanism (not shown) which operates in cooperation with the ram of the terminal attaching machine (schematically shown at **40**). Pawl **22** has a terminal advancing lip **22*a*** and a terminal ejection lip **22*b*** which is spring biased downwardly by leaf spring **22*c***.

As shown more clearly in FIGS. 2–4, wire guide **18** of the present invention comprises an upper arm **24** pivotally mounted on posts **26** and a lower arm **28** also pivotally mounted on posts **26**. Upper arm **24** has a rearwardly converging slot **24*a*** milled on its underside and lower arm **28** also has a rearwardly converging slot **28*a*** milled on its upperside, slots **24*a*** and **28*a*** being in alignment such as to form a conically shaped wire receiving guide. Arms **24** and **28** are also respectively provided with meshing gear segments **24*b*** and **28*b***, gear segments **24*b*** and **28*b*** having radii of curvature whose centers are at the pivot points of arms **24** and **28**. Upper arm **24** is also provided with a hole or slot **30**.

Arms **24** and **28** are normally biased towards each other by spring **32**, a space being maintained between arms **24** and **28** by peg **34** mounted on post **36**.

A wire guide opening mechanism consists of an arm **38** mounted on ram **40** of the terminal attaching machine. Arm **38** has mounted thereon a plunger **42**. Plunger **42** has spring mounted on its end pin **44**.

In operation, feed drum **10** positions a wire **14** opposite the converging slots of arms **24** and **28**. A feed wheel (not shown) moves the wire **14** along its horizontal axis until it comes into engagement with slots **24*a*** and **28*a***. As wire **14** is further moved by the feed wheel, guide **18** positions the wire **14** with respect to an individual terminal strip **20** so that a correct crimping of terminal **20** on the end of the wire will be accomplished. As wire **14** is advanced further, it is stopped in its motion by stop **48**. As ram **40** descends to crimp a terminal on a wire **14**, pin **44** passes through hole **30** of arm **24** and comes into contact with the upper surface of arm **28**, causing compression of spring **50**. Further downward movement of ram **40** overcomes the counter biasing effect of spring **32** causing arm **28** to move down-

wardly. Rotation of gear segment **28***b* about its pivot causes the rotation of gear segment **24***b* of arm **24** which will cause arm **24** to move upwardly. This downward movement of arm **28** and upward movement of arm **24** is accomplished after a terminal has been crimped on wire **14** and thus allows wire **14** to be easily removed from guide **18** without interference from the guide.

As ram **40** moves upwardly, spring **50** is relieved from compression, allowing arms **24** and **28** to return to their normally biased closed position. Peg **34** supports arm **24** in a substantially horizontal position and the meshing of gear segments **24***b* and **28***b* as well as the bias of spring **32** function to support arm **28** also in a normally horizontal position.

Thus it will be seen that the wire guide of the present invention provides for correct positioning of wires **14** with respect to terminal attaching position **16** in order that terminals **20** may be correctly crimped on the lead ends of wire **14** while at the same time allowing wire **14** to be removed without interference from the wire guide **18** after the terminal attaching operation has been completed.

While the device illustrated and described represents a preferred embodiment, it will be appreciated that mechanical equivalents can be employed without departing from the scope of the appended claims.

What is claimed is:

1. A guide for positioning wires for attachment of terminals on the ends thereof by a terminal attaching device comprising a frame, a pair of arms vertically disposed adjacent each other, both of said arms being pivotally mounted on said frame, said arms being in operational engagement with each other, said arms having rearwardly converging slots on the adjacent surfaces thereof such that said slots form a wire receiving and positioning guide and means linked to said terminal attaching machine to cause said arms to pivot away from each other after the attachment of a terminal to said wire positioned by said guide such that said wire may be removed from said guide without interference from said guide.

2. The wire positioning guide of claim **1** including spring bias means for normally biasing said arms together.

3. The wire positioning guide of claim **2** including pin means mounted on said frame positioned between the adjacent surfaces of said arms, said pin means adapted to support said arms in a substantially horizontal position and to maintain a spacing between said arms.

4. A guide for positioning wires for attachment of terminals on the ends thereof by a terminal attaching device comprising a frame, an upper arm and a lower arm disposed adjacent each other, said arms being pivotally mounted on said frame, said upper and said lower arms respectively being provided with gear segments on their adjacent sides at the pivoted ends of said arms, said gear segments being in meshing engagement with each other and having radii of curvature whose centers are at the pivot points of said arms, said arms having rearwardly converging slots on the adjacent surfaces thereof such that said slots form a wire receiving and positioning guide and means linked to said terminal attaching machine to cause said lower arm to pivot downwardly and thus cause said upper arm to pivot upwardly by means of the meshing engagement of said gear segments after a terminal has been attached to a wire by said terminal attaching machine.

5. The wire positioning guide of claim **4** wherein said linkage means comprises a spring biased pin mounted on the terminal attaching ram of said terminal attaching machine, and wherein said upper arm has a slot therein adapted to pass said pin such that downward movement of said ram causes said pin to pass through said slot in said upper arm and come into engagement with the upper surface of said lower arm and cause said arms to pivot away from each other after a terminal has been attached to said wire.

6. The wire positioning guide of claim **5** including spring bias means for normally biasing said arms together.

7. The wire positioning guide of claim **6** further including pin means mounted on said frame, positioned between the adjacent surfaces of said arm, said pin means being adapted to support said arms in a substantially horizontal position and to maintain a spacing between said arms.

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