

[54] **WIRE GUIDE**

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29/200 P

[56] **References Cited**

UNITED STATES PATENTS

2,683,924 7/1954 Schryver29/203 DT

3,423,815 1/1969 Spangler et al.29/203 D

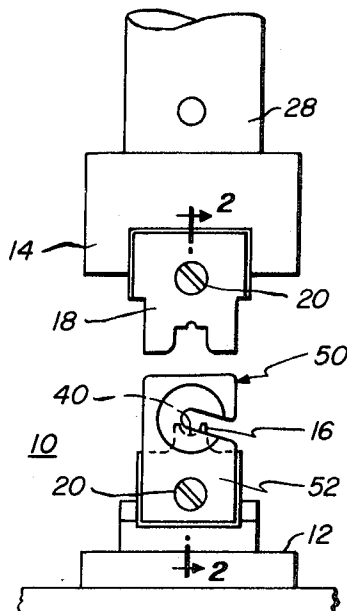
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[57] **ABSTRACT**

A wire guide for facilitating the entry of a wire end into a funnel ferrule terminal prior to crimping of the terminal onto the wire. The guide is alignable with the crimping device to allow the manual insertion of the wire through the guide into the ferrule. The guide has a slot generally horizontal and inclined from an enlarged entry area upwardly to an area alignable with the ferrule opening to facilitate the wire insertion and to permit the removal of the crimped assembly.

7 Claims, 7 Drawing Figures



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WIRE GUIDE

BACKGROUND OF THE INVENTION

The present invention is designed for use with devices similar to the press shown in U. S. Pat. No. 3,423,815 issued to Paul J. Spangler on Jan. 28, 1969 for Fluid-Actuated Crimping Press, the patent having been assigned to the assignee of the present invention. In that press, a cam depresses an upper die onto a lower die to crimp a ferrule about a wire conductor to firmly affix the ferrule to the wire.

The invention described herein applies to the procedure of inserting the wire end into the ferrule while the ferrule is resting in the guide. The wire and ferrule are thereby aligned with respect to the crimping press to thereby shorten the interval between press operations by simplifying the manual assembly step between press operation.

It has been found that insertion of a wire into a ferrule for crimping cannot readily be effected by automatic machine methods. The ferrule may be fed automatically to the crimp die but the insertion is done manually.

In such presses in which the wire is inserted manually, it has been found that the manual step of feeding the wire end into the ferrule is time-consuming, is subject to large deviations in human dexterity and is the one step most capable of improvement.

It has been found that even where funnel ferrules are used, the comparatively narrow width of the funnel entrance or mouth and the comparatively large entrance angle inhibits the ability of the machine operator to efficiently insert the wire end on a repetitive basis.

SUMMARY OF THE INVENTION

To alleviate the problems noted, I have devised the wire guide shown and described herein. My wire guide mounts on the press adjacent the lower press die into which a ferrule is guided for crimping. In one form the ferrule may be fed as part of a tape automatically advanced to feed a ferrule to the press. The ferrule feed places the ferrule on the crimp die adjacent the wire guide. The guide has a wide entry which funnels and directs the wire into the ferrule entrance. The exit passage from my guide opening is sufficiently large to allow the end of the insulation to enter the ferrule to any extent desired. The wire can then be crimped with in the ferrule. Crimping, of course, affixes the ferrule to the wire, and the press during the crimp detaches the ferrule from the tape. My guide further has a downwardly inclined exit slot through which the crimped assembly (including wire and ferrule) may be removed from the assembly area. The exit slot has at its outlet an enlarged section to allow the ferrule to pass from the slot with a minimum of interference. My guide has no moving parts, allows ready entry of the ferrule and wire and ready removal of the crimped assembly.

Use of a wire guide such as mine was not practical prior to development of the funnel ferrule terminal, as the most difficult part of the wire insertion was in passing all the wire strands into the terminal bore. On a straight ferrule terminal, the wire strands tend to hang up at the entry to the terminal bore, in spite of the chamfer on the inside entry edge of the bore. For this reason, a manual "feed" is needed to insert the wire in the terminal. For a straight ferrule terminal, the use of

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the subject wire guide only makes insertion more difficult by restricting the operator's freedom of movement and confusing his sense of feel. For a funnel ferrule terminal, however, the wire is easily funneled into the terminal bore and the subject wire guide facilitates even further the insertion of the wire by funneling the wire into the entry to the funnel ferrule terminal.

It is therefore an object of the invention to provide a wire guide for use in a crimping press.

It is a further object of the invention to provide a new wire guide having a funnel adapted to align a wire with the mouth of a ferrule into which the wire is to be inserted.

It is a still further object of the invention to provide a guide for wire insertion which allows ready removal of the completed assembly.

These and other objects, features and advantages of the invention will become apparent when the accompanying drawings are viewed in conjunction with the detailed description which follows.

FIG. 1 is a front view in elevation of a Crimping Press in which my invention is mounted;

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a front view in elevation of a guide according to my invention;

FIG. 4 is a right side view in elevation of the guide of FIG. 3;

FIG. 5 is a rear view of the guide of FIGS. 3 and 4;

FIG. 6 is an end view in elevation of a funnel ferrule usable with my invention; and

FIG. 7 is a side view partially in section of the ferrule of FIG. 6.

Turning to the drawings in detail, in FIGS. 1 and 2, I show a press 10 of the type shown in the U. S. Pat. No. 3,423,815, to Spangler et al. cited above. The press has a bottom die holder 12, a counterpart upper die holder 14 and suitable lower and upper crimping dies 16 and 18. Retaining screws 20 secure the respective dies within the die holder as is well-known in the art to allow one die (usually the upper die) to be moved by a ram 28 into engagement with the lower die under the control of the press to crimp a ferrule 30 about a wire 32.

With the upper die 18 and ram 28 retracted to the position of FIGS. 1 and 2, the lower die 16 provides a cradle-like concavity 40 for the ferrule 30. The concavity 40 may be adjustable in one form or otherwise; different shaped dies may be used for ferrules of different dimensions and shapes. In any event, the ferrule bore 42 is disposed horizontally with the ferrule resting in the cradle of the die.

The guide 50 of the present invention connects to the lower die 16 by means of lower retaining screw 20. The guide is essentially a rectangular block 52 of steel or other suitable rigid, abrasion resistant material. The block 52 has its upper surface 54 sloped toward its rear face 56 adjacent the die to reduce the possibility of the rear face of the guide interfering with the upper die in its travel.

In its front entry face the guide block 52 has a funnel shaped opening 60 with the walls 62 of the opening tapering to a comparatively small diameter bore 64 adjacent the guide block rear face. The bore 64 will be either equal to or preferably smaller in diameter than the entrance or mouth 68 of the ferrule funnel 70. The

ferrule funnels to its normal wire-receiving bore 42 within which the wire conductor 74 rests and within which the conductor is crimped.

The guide block has a generally horizontal slot 78 seen best in FIGS. 3-5 extending through it from front to rear. On a side-to-side basis, the slot 78 angles downwardly from its joinder to the funnel opening 60 to its exit 80 from the side wall 82 of the guide block. At the exit from the block the slot has its mating edge with the rear block face curvedly blended with a radial curvature 84 extending fully from the rear to front face of the block.

In use, the guide is mounted in alignment with a die cradle and with the bore of a funnel ferrule opening. Normally, the ferrules are tape mounted for feeding into the die and to hold the ferrules on the tape against movement. A wire 32 with its conductor 74 stripped of insulation for a sufficient length is moved horizontally into the funnel opening 60 and fitted by the operator into the mouth of the funnel ferrule. The wire is inserted until the insulation passes through the guide bore 64 to insure full insertion of the wire conductor into the ferrule.

Following insertion of the wire, the ram is lowered to crimp the ferrule about the wire conductor and to detach the ferrule from its tape. The crimped assembly may then be slid sidewardly and downwardly through slot 78 and away from the press. The curved or blended edge of the slot permits the ferrule to be turned somewhat as assembly is removed thereby materially reducing the possibility of the ferrule lodging and jamming within slot 78.

With the guide shown the manual insertion time is reduced. This manual insertion period comprises the greater portion of the time consumed during the crimping operation, since the machine operation portion of the cycle is capable of considerably greater speeds than the manual portion of the cycle. In this way the cycle portion forming the greatest slowdown of the cycle time is reduced.

Also by using a funnel ferrule and my wire guide, diameter of the funnel bore being used can be only slightly greater than the diameter of the wire being inserted, thereby leading to better conduction between the ferrule and wire and a tighter connection therewith without unduly long cycle time in effecting the insertion and crimping.

While there has been described what is at present thought to be the preferred embodiment of the invention, it is understood that modifications may be made therein, and it is intended to cover in the appended claims all such modifications which fall within the true spirit and scope of the invention.

I claim:

1. A wire guide for easing the passage of a stripped wire end into a funnel ferrule terminal for assembly comprising:

a substantially rectangular block of rigid material adapted to be positioned adjacent the funnel en-

trance of a ferrule,

a tapered opening in said block, including an entrant area tapering toward a wire exit area no greater in area than the area of the funnel entrance, and

means for holding a ferrule with the funnel entrance adjacent the wire exit area of said opening to enable ready entry of a wire end through said opening into the ferrule for assembly of the wire,

wherein there is a slot from the inside to the outside of said block, and said slot is positioned to permit removal of the assembly.

2. A wire guide as claimed in claim 1, wherein the exit from said slot comprises a curved declination adjacent a side wall of said block to allow ready removal of the terminal.

3. A wire guide for use with a terminal crimping device for crimping a funnel-shaped ferrule terminal about a wire end, the guide comprising: a substantially rectangular block of rigid material adapted to be positioned adjacent the funnel entrance of a ferrule, a guide passage in said guide block, a first portion of said passage tapering toward a work area of diameter no larger than the entrance of said funnel, ferrule supporting means, means for aligning said guide adjacent a ferrule mounted on said supporting means, a movable section of said crimping device engageable with supporting means during a crimping operation to crimp said terminal on a wire end, inserted through said passage to the work area, and a slot in said passage positioned to allow ready removal of a crimped terminal from the work area.

4. A guide as claimed in claim 3, wherein there is an enlargement of said slot adjacent the ferrule to permit ready removal of the ferrule from said slot.

5. A guide as claimed in claim 3, wherein said crimping device comprises a press including cooperative dies for effecting said crimping, and means for affixing said guide to a stationary one of said dies.

6. A combined wire guide and holder for easing the passage of a stripped wire end into a funnel ferrule terminal for assembly comprising:

a member of rigid material adapted to be positioned adjacent the funnel entrance of a ferrule,

an opening in said member including an entrant area tapering toward a wire exit area no greater in area than the area of the funnel entrance, and

means for holding a ferrule with the funnel entrance adjacent the wire exit area of said opening to enable ready entry of a wire end through said opening into the ferrule for assembly of the wire into the ferrule,

a slot in the side wall of said member providing sidewise open communication between said opening and the exterior of said member

whereby said slot allows removal of the assembly from the guide.

7. A combined wire guide and holder as claimed in claim 6, wherein there is means for mounting said guide stationarily to a stationary portion of said holder.

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