March 25, 1958 H. C. STOLTZ 2,827,941

CRIMPING APPARATUS FOR APPLYING A CONNECTOR TO A CONDUCTOR

Filed April 25, 1955 2 Sheets-Sheet 1

Fig. 1

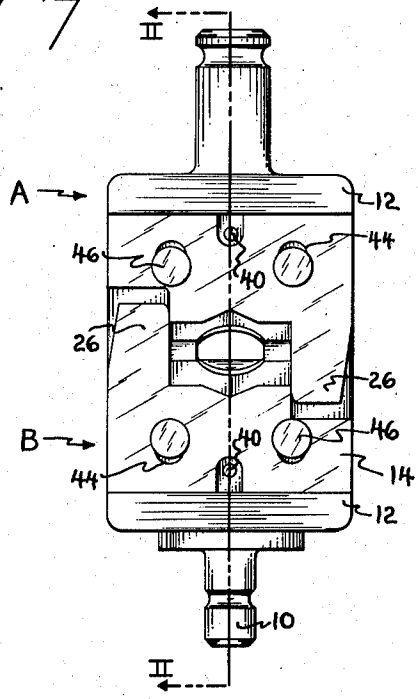

Fig. 2

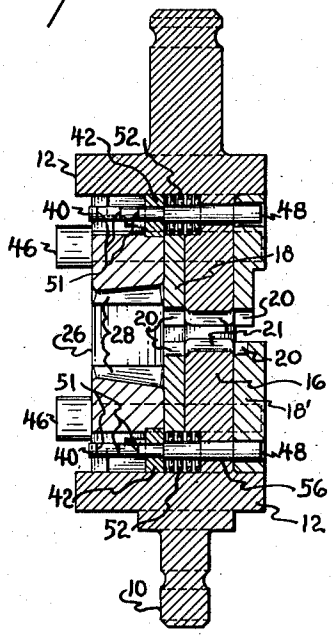

Fig. 3

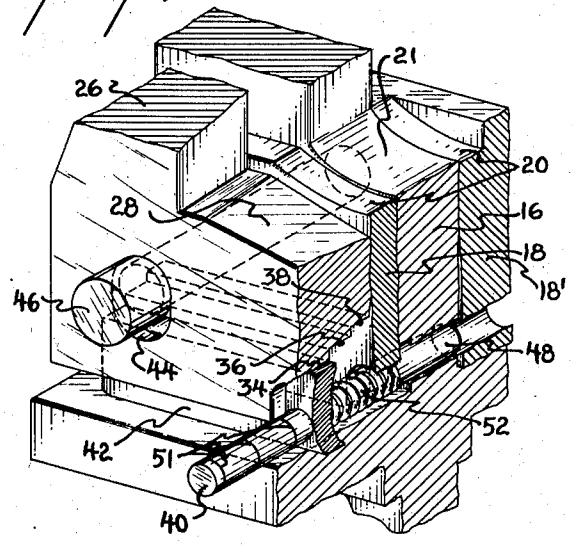

Fig. 4

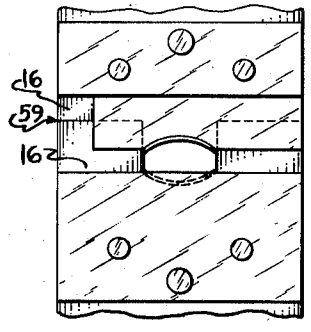

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Fig. 5

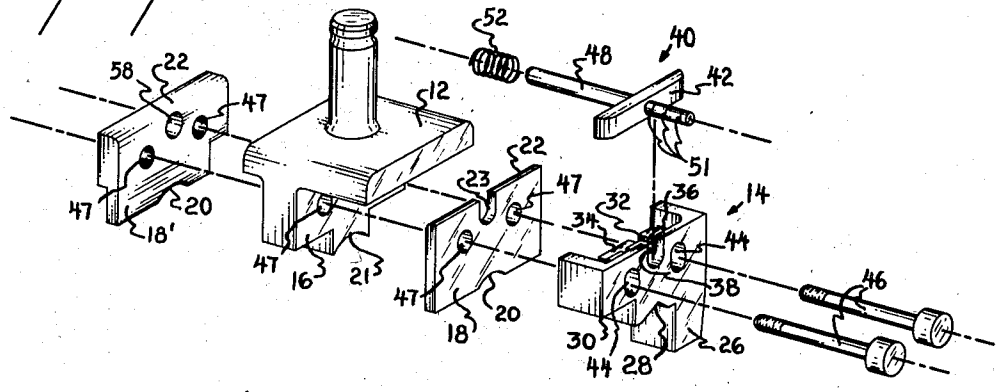


Fig. 6

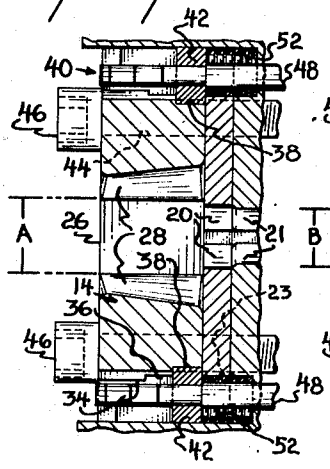


Fig. 7

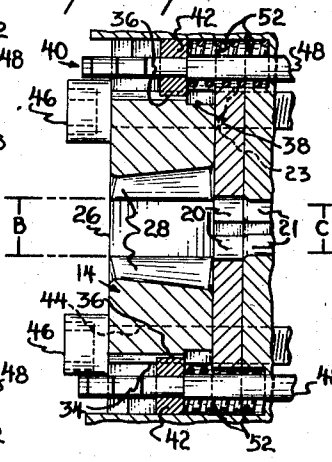


Fig. 8

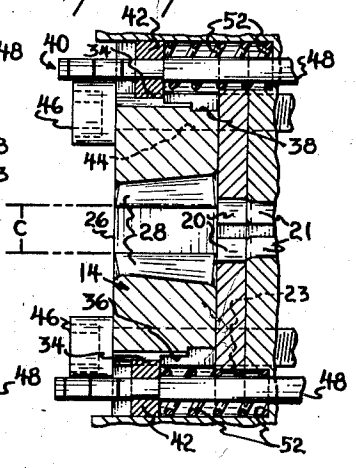


Fig. 10

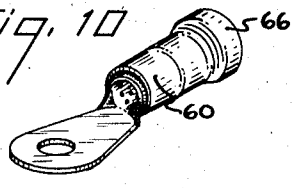


Fig. 9

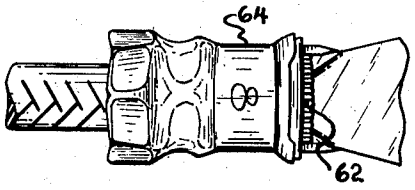
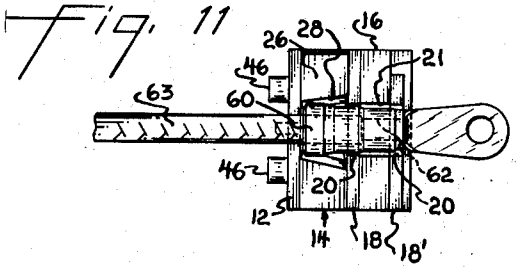


Fig. 11



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United States Patent Office 2,827,941 Patented Mar. 25, 1958

2,827,941

CRIMPING APPARATUS FOR APPLYING A CONNECTOR TO A CONDUCTOR

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Application April 25, 1955, Serial No. 503,531

4 Claims. (Cl. 153—1)

In the art of joining an electrical conductor to a connector it is particularly advantageous to provide a pre-insulated connector and to secure the insulation of the connector to the insulation surrounding the conductor by means of a crimping operation. Although wire sizes are standardized according to A. W. G. dimensions, different manufacturers employ varying amounts of insulation. For example, the insulation diameter of a No. 8 wire will not necessarily be uniform but will vary according to the manufacturer.

Thus it is an object of this invention to provide a set of dies for crimping a pre-insulated connector to a conductor and in the same operation crimp the insulation of the connector to the insulation of conductor whereby the insulation crimping means can be easily adjusted to accommodate conductor insulations of different outside diameters.

It is also an object of this invention to provide a set of insulation crimping dies that can easily be adjusted without removing the dies from the tool.

It is a further object of the invention to provide a set of insulation crimping dies that are so constructed as to permit the operator to know when the crimping dies are completely closed.

Other important features and objects of the invention to which reference has not been made hereinabove will appear hereinafter when the following description and claims are considered with the accompanying drawings, in which:

Figure 1 represents a front view of a preferred embodiment of the assembly.

Figure 2 shows a sectional view taken through II—II of Figure 1.

Figure 3 is a cut-away perspective view showing the relationship of the adjusting means for the insulation crimping die.

Figure 4 is a view of the conductor crimping members, demonstrating the cut-away section of the flare plate.

Figure 5 is an exploded view of one of the indenting members.

Figures 6, 7 and 8 show the insulation crimping device in three positions of adjustment.

Figure 9 shows a pre-insulated terminal crimped onto an insulated electrical conductor.

Figure 10 shows a pre-insulated terminal prior to the crimping operation.

Figure 11 shows the position of the pre-insulated terminal and conductor positioned relative to the crimping assembly.

The device shown in the drawings is particularly useful in crimping an electrical connector of the type having an inner metal ferrule, surrounded by a plastic sheath, for example, the type shown in the patent to Watts, No. 2,410,321.

The assembly is placed in any well known crimping tool having a pair of jaws capable of being urged toward each other radially in relation to the connector to be crimped.

A preferred embodiment of the die assembly includes a first die member generally designated A and a second die member which is generally designated B.

Referring to the particular first die member A shown in the drawings, a seating member **10** is removably secured to the tool. A supporting plate **12** is integral with the seating member **10**, and at right angles thereto. The plate **12** supports the insulation crimping means **14** (see Figure 5). A connector receiving die **16** is integral with the die plate **12**. A pair of flare plates **18** and **18'** are positioned one on either side of the plate **16** so that the surfaces of the notched portions **20** are coextensive with the conductor die surfaces **21**. The edges **22** of the flare plates seat on the supporting plate **12** so that the flare plates are parallel to the die **16**.

The insulation crimping device **14** is generally plate-shaped, as shown in Figure 5. A vertical projection **26** forms one side of insulation crimping die **28**. A graduated stepped portion **30** is provided in the opposite side of the crimping device **14** so that the projection **26** on each plate nests with the step **30** in the opposite plate to form a complete insulation crimping apparatus.

To provide for adjustment of the insulation crimping die a slot **32** having steps **34, 36, 38**, is fashioned in the inner face of the plate **14** at the edge that seats on the supporting plate **12**. An adjustment assembly **40** has a rectangularly shaped shoulder **42** that may be positioned to adjust the position of the insulation crimping device **14**. The pin **48** is adjustable longitudinally to position the assembly **40** so that one of the steps on the insulation crimping means will seat on the shoulder **42**. Thus, the insulation crimping means can be adjusted by changing the position of the assembly relative to the insulation crimping plate.

Slotted holes **44** in the plate **14** accommodate screws **46**. The slotted holes **44** are oversize to allow the plate **14** to be moved toward or away from the supporting plate **12**. Corresponding screw holes **47** and **47'** are provided in the flare plates **18** and **18'** and die plate **16** respectively. The screw holes **47** in the flare plate **18'** are tapped to receive the threads on the outer surface of the screws.

Turning now to the assembly **40** (see Figure 5) the particular embodiment shown includes a cylindrical pin **48** and a rigidly secured rectangular member **42** at right angles thereto. One of the steps **34, 36** or **38** seats on the rectangular member and the cylindrical member is used to longitudinally adjust the position of the assembly **40**, thus adjusting the spacing of the insulation crimping members. A spring **52** surrounds one end of the pin **48**. The spring is disposed between the rectangular shoulder **42** and the die plate **16** (see Figures 6–8). Marks **51** on the cylindrical member indicate the setting of the assembly.

In assembly (Figures 2 and 3) the flare plates **18** and **18'** are placed on either side of the die plate **16**. The notched edges **20** are aligned with the conductor-crimping die **21**. The spring **52** is placed in the opening **23** of inner flare plate **18**, and one end of the pin **48** is placed longitudinally through the spring **52**. The opening **56** in the die plate **16** permits the passage of the pin **48** but not the spring **52** (Figure 2). Thus, the spring **52** seats against the inner face of the die plate **16** while the pin **48** moves longitudinally through the opening **56** in the plate **16**. The inner flare plate **18** straddles the spring and pin at opening **23** (see Figures 2 and 5). The opening **58** in the outer flare plate **18'** is aligned with the openings **56** and **23** in the die plate and inner flare plate respectively, so that the cylindrical member **48** is movable longitudinally through the openings. As shown in Figures 2 and 3 the insulation crimping die **14** is seated on the supporting plate **12** with the slot **32** adjacent the

inner flare plate 18 so that one of the steps 34, 36 or 38 seats on the rectangular member 42. The screw members 46 pass through the screw holes and are threaded into the flare plate 18' to hold the flare plates and insulation crimping assembly in proper alignment.

The other indenting member "B" is identical with the first indenting member "A" except for the shape of the conductor-crimping die. The conductor-crimping dies shown in the drawings are merely an illustrative embodiment of the preferred form. It is obvious that dies of various shapes may be employed.

When assembled the members A and B are secured to opposing jaws of the crimping tool. An insulated connector barrel 60 is seated in the connector-crimping die 21 and the bare end 62 of the conductor 63 is placed therein, as shown in Figure 11. The insulated skirt of the connector seats in the insulation crimping nest 28. The insulation on the conductor is so arranged as to extend no further than the inner flare plate 18. When the tool jaws are closed the conductor crimping dies cooperate to crimp the conductor onto the ferrule portion 64 on the connector and the insulation crimping dies 28 cooperate to crimp the insulation skirt 66 of the connector onto the insulation of the conductor thus effectively crimping the terminal onto the conductor as shown in Figure 9.

The flare plates act as tapering means between the conductor crimping dies 21 and the insulation crimping dies 28. This prevents the formation of a sharp corner on the connector insulation at the junction of the conductor insulation and the conductor crimp, see Figure 9. Such a precaution reduces the possibility of tearing the insulation on the connector.

Figure 4 shows a portion of the flare plate 18' broken away as at 59. This permits the operator to view the relationship of the conductor crimping dies 16 when the tool is in closed position to make sure that the dies have bottomed and that the crimp is complete.

Figures 6 to 8 show the insulation crimping assembly in three different adjustments. Figure 6 shows the assembly with the maximum width A between the insulation crimping dies. In this position the shoulders 42 seat on steps 38. Figure 7 shows the intermediate adjustment B with the shoulders 42 seated on steps 36. Figure 8 shows an adjustment of the insulation crimping means with the minimum width C between the insulation crimping dies. The shoulders 42 are seated on the outermost steps 34.

When it is desired to change the setting of the insulation crimping plate from a wide to a narrower setting, the screws 46 are loosened to permit movement of the insulation crimping means 14 from the widest setting as shown in Figure 6 to the narrower setting of Figure 7. The pin member 48 is moved longitudinally by the action of the spring 52. Whereas the plate 14 formerly seated on step 38 it now seats on step 36 and the plate 14 is moved in a direction away from the support plate 12. The plate 14 of the other die may be shifted in a similar manner. Of course, an intermediate adjustment may be made by only changing the setting of one of the insulation crimping dies. The screws are then tightened to hold the parts in place. Since the plates 14 are moved toward each other, the opening between them is decreased. Should it be desired to decrease the opening further the operation is repeated and the plates can be again shifted to so that they seat on the steps 34.

When the insulation crimping apparatus is assembled the spring 52 urges the rectangular member 50 outwardly and it is locked in the position shown in Figure 8. When it is desired to adjust the insulation crimping dies from the narrowest setting as shown in Figure 8 to wider setting of Figure 7, the screws are loosened and the rectangular wedge 42 is urged inwardly against the action of spring 52 and the housing is locked in place.

Since either of the insulation crimping dies can be moved to a new position independently of the other, six positions are available. However, theoretically any number of steps can be provided to allow a greater latitude of adjustments.

It is noted that the described embodiment provides an adjusting means which is accessible from the front of the insert so that it is not necessary to remove the insert assembly from the tool to make such an adjustment.

I claim:

1. An assembly for crimping an electrical connector onto an insulated conductor comprising a pair of spaced supporting plates, a conductor-crimping means associated with each plate, an adjustable, insulation-crimping means associated with each plate, said insulation-crimping means comprising a pair of rectangular members having complementary, spaced die surfaces, a graduated stepped slot in each of the members and an adjusting member slidably positioned between each supporting plate and one of the steps in the slot of the respective member, whereby the spacing between the die surfaces on the insulation-crimping means may be adjusted by moving either of the rectangular members relative to its supporting plate and its adjusting member.

2. The device of claim 1 wherein a flare plate is seated on the supporting plate on each side of the conductor-crimping means and one of the flare plates has a recess in the vicinity of the crimping surfaces of the dies, whereby the operator may observe the degree of closure of the dies.

3. A device as set forth in claim 1 including an outwardly extending pin on each adjusting member, each of said pins extending through an opening in its respective rectangular member, whereby the rectangular member may be adjusted by moving the pin.

4. The device as set forth in claim 3 including a releasable locking means holding each of the rectangular members in a predetermined position, and spring means resiliently urging the adjusting means toward one position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,359,083	Carlson	Sept. 26, 1944
2,639,754	Macy	May 26, 1953
2,692,422	Pierce	Oct. 26, 1954

FOREIGN PATENTS

567,145	Great Britain	Jan. 30, 1945