

July 18, 1961

W. R. EVANS ET AL

2,992,576

HAND CRIMPING TOOL

Filed Nov. 19, 1957

3 Sheets-Sheet 1

FIG. 1

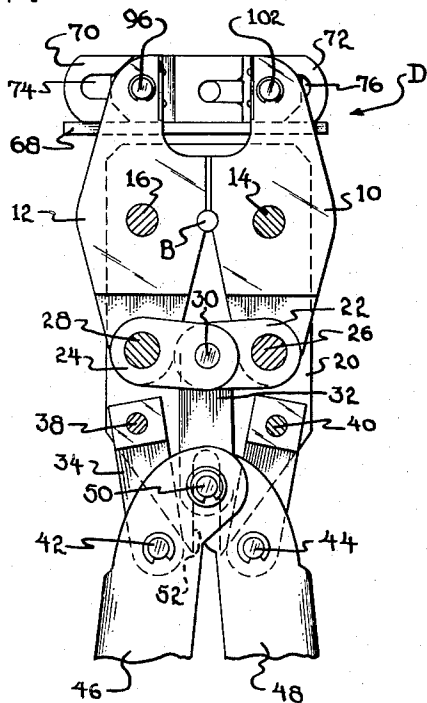


FIG. 2

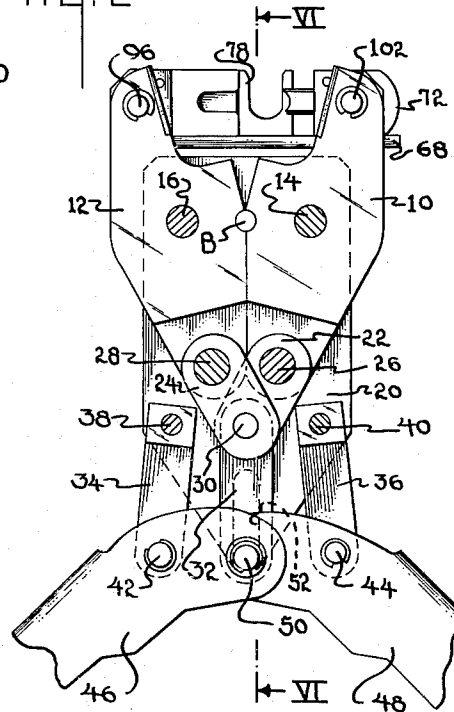
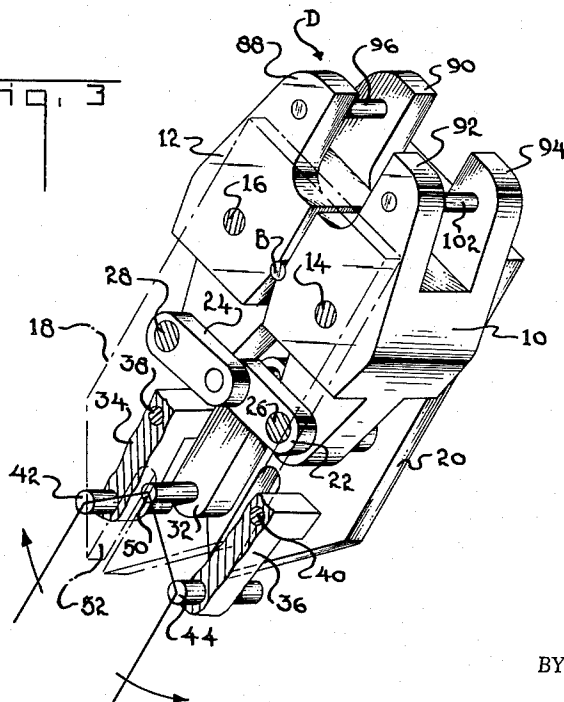


FIG. 3



INVENTORS
William R. Evans
BY Howard E. Stine Jr.

Burdick, Morris & Safford

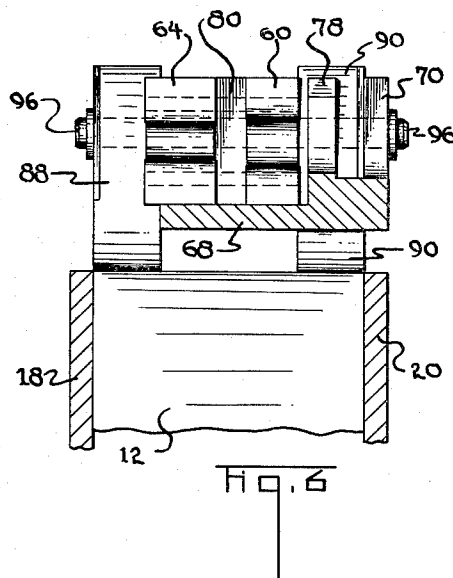
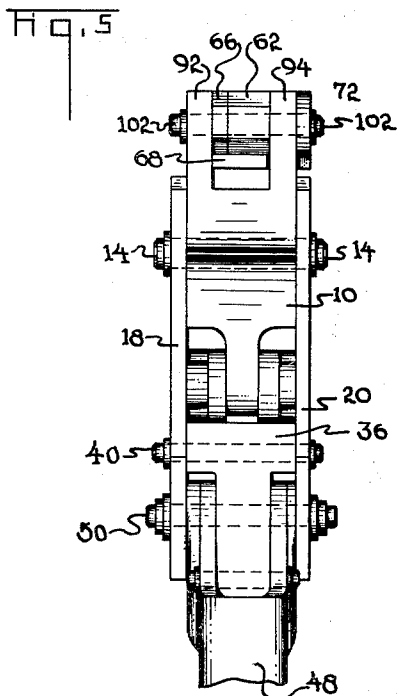
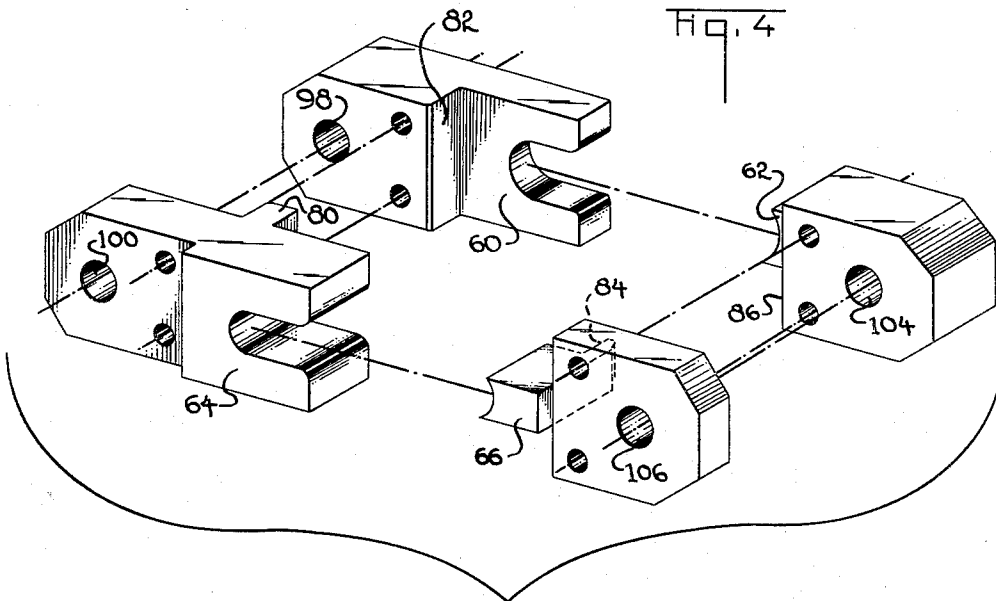
July 18, 1961

W. R. EVANS ET AL
HAND CRIMPING TOOL

2,992,576

Filed Nov. 19, 1957

3 Sheets-Sheet 2



INVENTOR.
William R. Evans
BY Howard E. Stine Jr.

Kurtz, Morris & Safford

July 18, 1961

W. R. EVANS ET AL
HAND CRIMPING TOOL

2,992,576

Filed Nov. 19, 1957

3 Sheets-Sheet 3

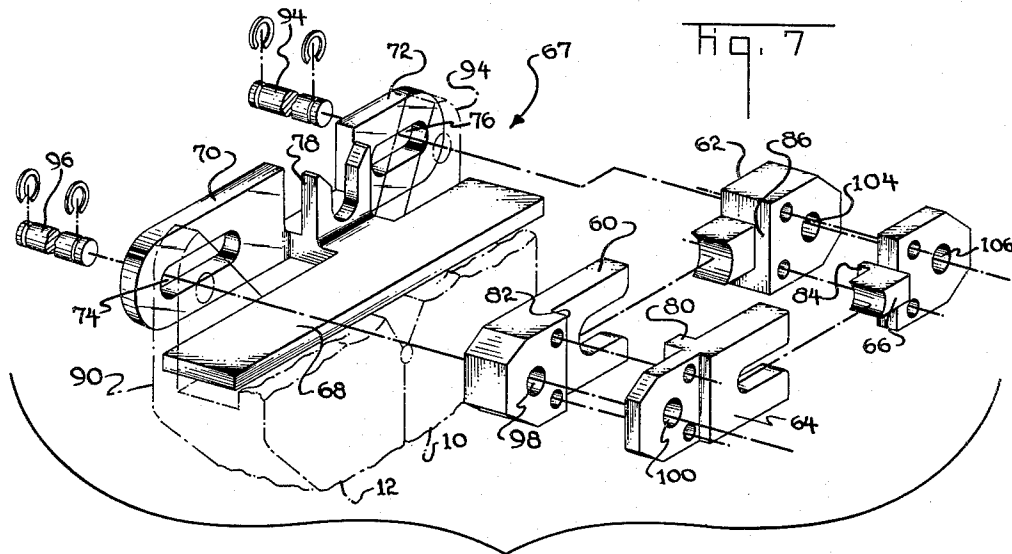
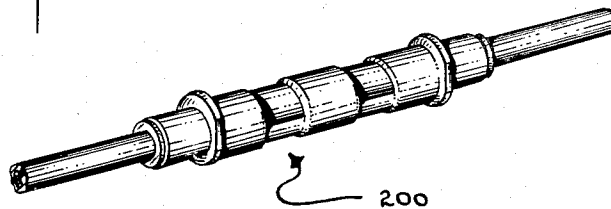


Fig. 8



INVENTOR.
William R. Evans
BY Howard E. Stine Jr.

Burtis, Morris & Safford

1

2,992,576

HAND CRIMPING TOOL

William R. Evans, Hershey, and Howard E. Stine, Jr.,
Harrisburg, Pa., assignors to AMP Incorporated
Filed Nov. 19, 1957, Ser. No. 697,479

1 Claim. (Cl. 81-15)

Securing electrical connectors to conductors is a precise and highly developed art. The segment of the art directed to hand operated crimping tools may roughly be divided into tools where the crimping dies describe an arc during the crimping operation ("scissors type" tools) and the type wherein the dies are driven together in a straight line path (called "straight-action" tools).

Rotary action dies start the crimp at the lowest part of the connector and work upwardly, due to the rotational movement of the dies.

The straight action jaws, however, permit symmetrical dies to be impressed on the connector with the die surfaces evenly bearing on the entire periphery of the connector to produce a uniform crimp.

The present invention contemplates a tool, as described, which converts rotary or "scissors" action of the handles into straight action of the dies.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is 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 it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

FIGURE 1 constitutes a plan view of a tool embodying the principles of the present invention;

FIGURE 2 is a view similar to FIGURE 1 showing the tool in the open position;

FIGURE 3 is a perspective view of the device shown in FIGURES 1 and 2;

FIGURE 4 is an exploded view showing one embodiment of die structure;

FIGURE 5 is a side view of the tool shown in FIGURES 1 and 2;

FIGURE 6 is a sectional view taken along plane VI-VI of FIGURE 2;

FIGURE 7 is a fragmentary view showing the relationship of the die of FIGURE 4 to the tool;

FIGURE 8 is a crimped connector deformed by a tool of the type shown in FIGURES 1 and 2.

FIGURE 1 shows a pair of jaws 10, 12 rotatable about pivot pins 14, 16. One end of each jaw carries the crimping mechanism and the other end is secured to the actuating means. The pivot pins 14, 16 are seated in face plates 18, 20 (which comprise the body of the tool), shown in FIGURE 2 (the front face plate 18 is not shown in FIGURES 1 and 2, so that the linkage mechanism may be illustrated).

The portion of the jaws containing the crimping dies is generally designated "D" and will be described later.

The opposite end of each jaw is secured to one end of the first set of links 22, 24 by means of pivot pins 26, 28 seated in the jaws. The links 22, 24 are commonly pivoted at the other end by pin 30 seated in a connecting bar 32.

A second set of links 34, 36 is pivoted at one end about pins 38, 40 seated in the face plates 18 and 20. The second set of links 34, 36 is also commonly pivoted at

2

the other end by pins 42, 44. Each of the pins 42, 44 is pivotally seated in one of the handles 46, 48 near the extremity of the handle. The corresponding ends of the handles are commonly pivoted by pin 50, which is seated in the connecting bar 32. The plates 18 and 20 are slotted as at 52 to permit travel of projecting portions of pin 50. A bearing B is disposed between the jaws 10 and 12 to reduce wear and friction.

Operation of the linkage is fairly obvious from the above description. Briefly, inward (toward the axis of the tool) movement of the handles causes inward pivotal movement of links 34, 36 and upward movement of pin 50 and consequently of bar 32 and pin 30. The upward movement of pin 30 spreads the links 22, 24, pins 26, 28 and the corresponding ends of the jaws 10 and 12. Outward movement of the lower ends of jaws 10, 12 causes rotation about pins 14, 16 whereby the upper ends of jaws 10, 12 bring the crimping dies into cooperative engagement.

Directing attention to the crimping die sets (note FIGURES 4 and 7) two pairs are provided, one for crimping the connector to the bare conductor and the other for crimping the connector to the insulation on the conductor. The conductor crimping dies (FIGURE 4) include die nest 60 and a mating indenting die 62. The insulation crimping dies include a die nest 64 and the indenting die 66.

An aligning assembly 67 includes a guiding plate 68 (FIGURE 7) which has a pair of upstanding ears 70, 72 with slots 74, 76 therein. A connector locator 78 projects from the guide plate and functions properly to locate a connector relative to the dies.

As shown in FIGURE 7 the die nest 64 has a projection 80 which mates with shoulder 82 on the die nest 60. The die 66 also has a projection 84 which mates with shoulder 86 on the die 62. Thus the dies and the die nests cooperate so that they each move as a unit.

FIGURE 3 illustrates jaws 10 and 12, with projecting ears 88, 90, 92, 94. A pin 96, extending through the ears 88 and 90, also projects through the slot 74 and the apertures 98, 100 in the die nest bodies 60, 64. A similar pin 102 connects apertures 104 and 106 in die bodies 62 and 66. The pin 102 extends through ears 92 and 94. Thus the die nests 60, 64 are fixed with respect to each other but movable with respect to the ear 70. Similarly the dies 62, 66 are fixed to each other but movable relative to the ear 72.

The guiding assembly 67 is suspended from the pins 96, 102. The elongated slots 74, 76 permit the jaws 10 and 12 to move laterally relative to the guiding assembly 67. The guiding plate 68 cooperates with the flat surface of the dies 62, 66 and the die nests 60, 64 and prevents them from pivoting out of alignment when the jaws are in the open position (FIGURE 2). Thus the dies remain in the same relative plane as the corresponding die nests during the entire crimping cycle. This effectively converts the rotary motion of the jaws into lateral or longitudinal movement of the dies and die nests.

Operation

With the tool in the open position shown in FIGURE 2, a connector is inserted between the dies 62, 66 and the corresponding die nests 60, 64. The connector may be properly positioned by locator 78. A stripped conductor is inserted into the connector and handles 46, 48 are brought together. The link 30 is driven upwardly to cause the lower portion of the jaws 10, 12 to pivot outwardly about their respective pivot pins 14 and 16. The upper portions of the jaws 10 and 12 are brought toward each other and describe an arcuate path. Since the guiding assembly 67 is pivotal relative to the jaws 10, 12 the assembly maintains a horizontal position throughout the

3

crimping cycle. This assembly guides the dies and die nests (which are also pivotal) in a horizontal direction so that they travel along a straight path. Thus the rotary movement of the jaws is effectively translated into a longitudinal movement of the dies and die nests.

After the die and die nests bear upon the connector to crimp it to the conductor, the jaws are opened and the crimped connector is reversed. Then a second conductor is fed into the other end and the cycle is repeated to make the crimped connection 200 as shown in FIGURE 8, of course other types of terminals may be employed wherein only one crimping cycle is required.

I claim:

A hand crimping tool for compressing an electrical connector onto a conductor comprising: a body member comprised of a pair of parallel plate portions, a pair of partially rotatable crimping jaws pivotally supported by said plate portions, means for partially rotating said jaws with respect to said plate portions, crimping means on each of said jaws disposed for mutual cooperation, means constraining said crimping means to straight line travel when the jaws are rotated, said means for partially rotating said jaws including a pair of handle members pivotally

4

connected together, a pair of links pivotally connected at one end to said plate portions and at the opposite end to said handle members, a second pair of links pivoted at one end to said jaws and commonly pivoted at the opposite end, and a connecting bar pivoted at one end to said handle members and at the opposite end to the common pivot of the second linkage.

References Cited in the file of this patent

UNITED STATES PATENTS

804,295	Zacharias	Nov. 14, 1905
1,005,268	Metzger	Oct. 10, 1911
1,315,235	Olsen	Sept. 9, 1919
1,924,844	Edwards	Aug. 29, 1933
2,035,686	Briegel	Mar. 31, 1936
2,063,532	Vertes	Dec. 8, 1936
2,086,400	Brenizer	July 6, 1937
2,256,457	Douglas	Sept. 16, 1941
2,462,536	Muter	Feb. 22, 1949
2,765,688	Evans	Oct. 9, 1956
2,829,547	Barnes	Apr. 8, 1958