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Barberio et al.

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[54] **CABLE CRIMPING DIE TOOL**

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[52] **U.S. Cl.** ..... **72/410,** 29/203 H, 81/426

[51] **Int. Cl.** **B21d 9/08**

[58] **Field of Search** ..... 72/409, 410; 81/418, 81/419, 421, 426; 29/200 H, 203 H, 203 HC, 203 HM, 203 HT, 212 R, 212 D, 280

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[57] **ABSTRACT**

A cable crimping die tool is provided in which the split halves of the die are adapted to be moved together to perform a crimping operation. One or more bores are provided in one of the halves of the die, and corresponding pins are provided in the other adapted to engage the bores to insure proper alignment of both portions of the die during a crimping operation.

2 Claims, 5 Drawing Figures

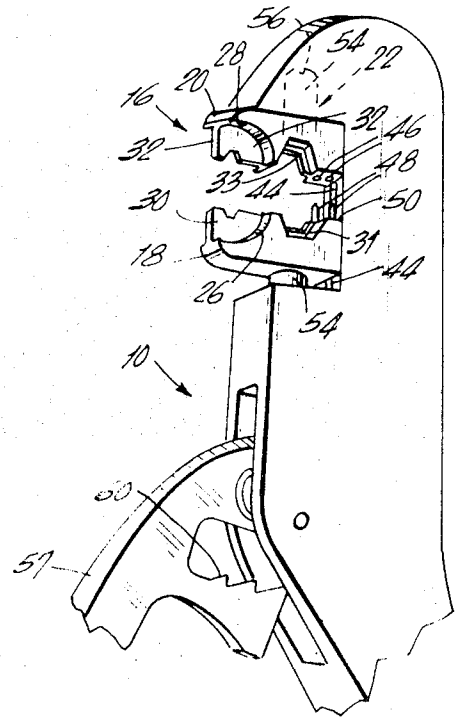


FIG. 1

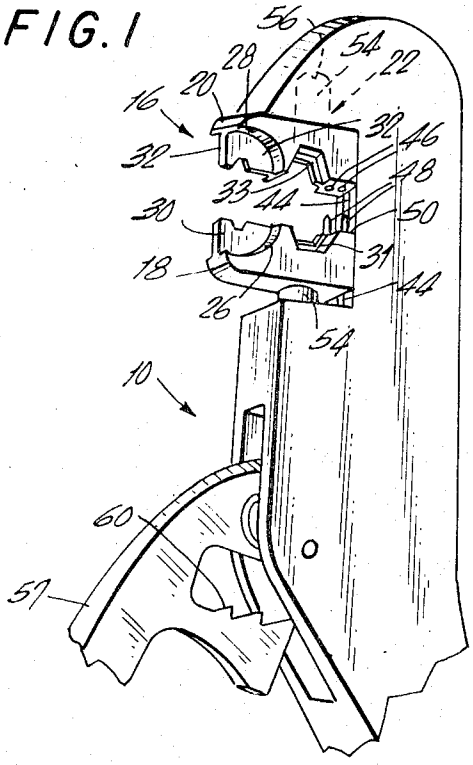


FIG. 2

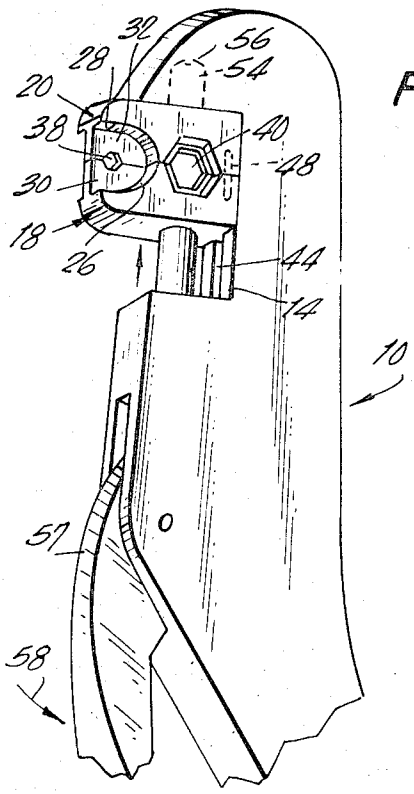


FIG. 3

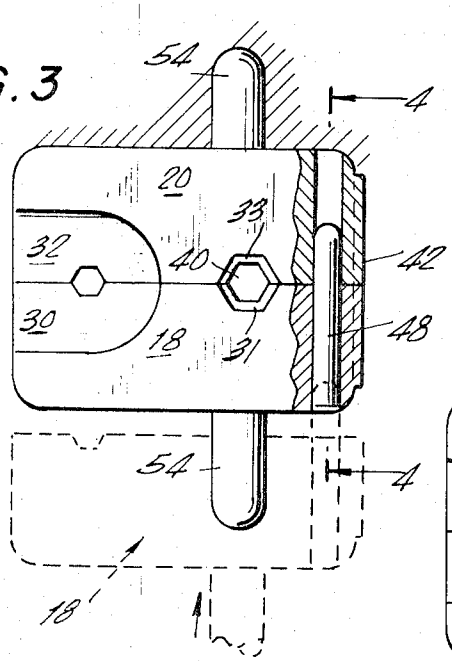
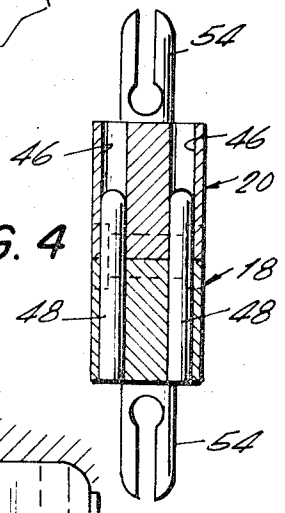


FIG. 4



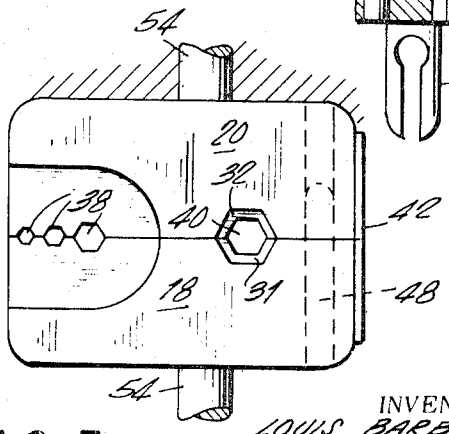


FIG. 5

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CABLE CRIMPING DIE TOOL

This invention relates to crimping tools, and more particularly, to alignment means for crimping dies.

In accordance with the present invention, a split crimping die is provided, each portion adapted for mounting on a crimping tool of well-known conventional design. The crimping die may be provided with one or more chambers adapted to crimp objects onto cables, electrical or otherwise.

Crimping dies are generally mounted on a crimping tool of the type which maintains one portion of the die fixed, while permitting the other portion of the die to move towards and away from the fixed portion to permit insertion of the cable to be crimped. The movable portion of the die is then urged towards the fixed portion and pressure applied to perform the crimping operation. Conventional structures place the movable die in a keyway provided in the crimping tool. As is the case with most conventional key and keyway connections, considerable slop exists in the mounting to permit friction-free movement without binding of the movable portion of the die. Rather huge pressures are brought to bear on the crimping die during the crimping operation. The slop engendered by the use of a key and keyway mounting often results in misalignment of the two die portions due to the high pressures used. As a result, somewhat ineffective and misaligned crimps result which may tend to destroy the utility of the crimp connection.

In accordance with this invention, one or more bores or openings are placed in one of the die portions, and one or more pins adapted to mate with the said bores are provided in the other die portion. In this manner, when pressure is applied to move the movable die portion into crimping contact with a cable, the pins are adapted to enter the bores and provide exact alignment for both portions of the crimping die. Of course, the pins are made somewhat longer than the diameter of the cable to be crimped to permit the pins to enter the bores prior to the exertion of heavy pressures in the crimping operation. This assures alignment during the crimping action. For best results, the heads of the pins facing the bores are of somewhat smaller diameter or decreasing diameter to provide for positive entry of the pins into the bores.

Referring now to the drawings in which like numerals refer to like parts:

FIG. 1 is an isometrical view of the crimping die of the instant invention shown in open position;

FIG. 2 is an isometrical view similar to that of FIG. 1 showing the crimping die in its closed position;

FIG. 3 is a side view in partial section of the crimping dies of the instant invention;

FIG. 4 is a view taken along 4 — 4 of FIG. 3 showing the pin and bore alignment means; and

FIG. 5 is a side view similar to FIG. 3 showing another embodiment of the crimping dies of this invention.

Referring now to FIGS. 1 and 2: 10 denotes a crimping tool having a cavity 14 therein adapted to receive a crimping die denoted by the numeral 16. Crimping die 16 has two symmetrical portions 18 and 20, portion 20 being affixed to the crimping tool at 22 by means to be hereinafter described. Portion 18 is affixed to a movable pressure applying ram 24, also by means to be hereinafter described.

Each of the die portions 18 and 20 has a plurality of recessed areas, 26 and 28 respectively, which define depending flanges 30 and 32, respectively, in both the upper and lower portions of the dies.

The upper portion of the crimping die defines a small polygonal chamber 38, and the lower portion of the die when in the closed position defines a larger polygonal chamber 40. Die portion 18 is provided with a key 42 (FIG. 3) adapted for mounting in a keyway 44 so that movement of ram 24 will move die portion 18 towards die portion 20 in a fairly straight manner. However, to prevent misalignment of the two die portions 18 and 20 during a crimping operation, a plurality of bores 46 (FIGS. 3 and 4) are provided in the stationary die portion 20, and a corresponding plurality of pins 48 are mounted on the forward face 50 of the movable die portion 18. Only two bores and two pins are shown, but it is to be understood that any number of bores and pins may be used. In addition, the number of pins need not equal the number of bores. In this manner, a universal type of crimping die may be made without changing the bore-making machinery or by having to specify the addition or deletion of pins on one of the dies.

For best results, the pin 48 is made somewhat longer than the diameter of the largest cable to be crimped to ensure entrance of the pin 48 into the bore 46 prior to the exertion of heavy pressure by the ram 24. To ease insertion of the pin 48 into the bore 46, the pin is provided with a hemispherical head 52. The crimping die described above may be mounted in the crimping tool by means of the depending flexible post 54, most readily seen in FIG. 4. Insofar as the stationary die portion is concerned, a bore 56 is provided in one portion of the crimping tool into which the flexible post 54 is inserted. By being made flexible, post 54 frictionally engages the interior of the bore 56 to retain the die portion 20 in position in the crimping tool. For mounting the movable die portion 18, ram 24 is made hollow (not shown) to receive flexible post 54 mounted on the movable die portion 18. Again, the flexible quality of the post 54 permits insertion of the post into ram 24 with frictional retention thereof being ensured.

In operation, the movable die portion 18 is maintained in the open die position when handle 57 of the crimping tool is in the position shown in FIG. 1. Upon movement of the handle downwardly in the direction of the arrow shown in FIG. 2, ram 24 will extend as shown in FIG. 2 to close and apply pressure to the crimping die to perform the crimping operation. To aid in applying pressure, a conventional ratchet mechanism 60 is provided on the handle 56.

FIG. 5 depicts an embodiment of this invention similar to that shown and described in FIGS. 1 through 4, with the exception that three chambers 38 of varying size are provided in the crimping die to permit crimping three different size cables.

As can be readily appreciated from the drawings, the largest chamber, namely, chamber 40, is provided in the portion of the crimping die adjacent the keyway 44 in in the crimping tool. This chamber is some distance above the keyway 44 to permit the pins 48 and bores 46 to be provided between the chamber 40 and the keyway 44. In operation, the greatest pressure will of course be required to crimp the larger cable, and it is for this reason that the chamber 40 is displaced from the keyway to make provision for the bores and pins in the region of greatest stress. Of course, the bores and

pins may be provided in any other location of the crimping die, but the farther these are removed from the keyway, the greater the chance for misalignment due to flexing or tilting of the die portions **18** or **20** about the keyway. Angular tilting motion of the die portions is of course more aggravated the farther one moves from the point at which angular motion occurs, and the problem of misalignment not only of the die portions but of the pins and bores **48** and **46** respectively, is eliminated by placing the pins and bores as close to the keyway as possible.

Although a plurality of crimping chambers **38** and **40** are shown, it is to be understood that the instant invention need not be provided with more than one such chamber if this is desired.

What is claimed is:

1. A crimping die for use in a crimping tool having a keyway comprising a first and a second portion movable with respect to each other from a first position in which said portions are spaced apart and a second position in which said portions are adjacent each other,

a key on at least one of said portions, said key being adapted to fit into the keyway on the crimping tool such that said portion is movable along said keyway,

a plurality of different sized chambers in one of said portions each of said chambers aligned with a corresponding chamber on said other die and

means for preventing transverse movement of said portions with respect to each other and between said portions and the crimping tool,

said preventing means comprising at least one bore in one of said portions located at a point between said chambers and said key and a corresponding number of pins in said other portion, said pins being aligned with said bores and having a length shorter than the distance between said portions when said portions are in the first position.

2. The die according to claim **1** wherein said pins are tapered to facilitate entry into said bore.

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