

[54] CRIMPING TOOL

[75] Inventor: Gustaf Rudolph Lawson,
Willingboro, N.J.

[73] Assignee: AMP Incorporated, Harrisburg, Pa.

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[56] References Cited

UNITED STATES PATENTS

839,651	12/1906	Sayer	72/472
1,046,120	12/1912	Stack	72/472
2,712,253	7/1955	Kontra	72/472
3,172,454	3/1965	Wilson	72/416
3,330,025	7/1967	Williams	72/410
3,396,571	8/1968	Porter	72/410
3,514,990	6/1970	Bauknight	72/410
3,553,999	1/1971	Rommel	72/410

Primary Examiner—Charles W. Lanham

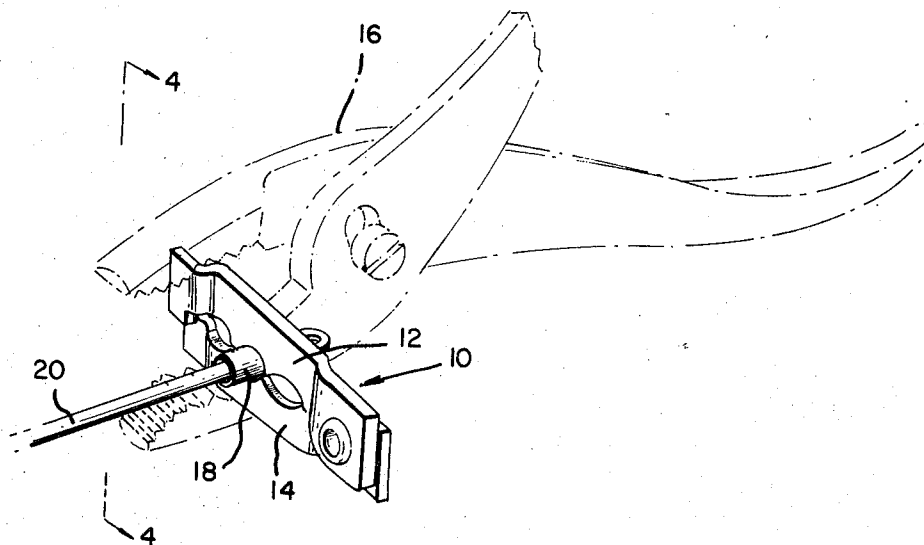
Assistant Examiner—Gene P. Crosby

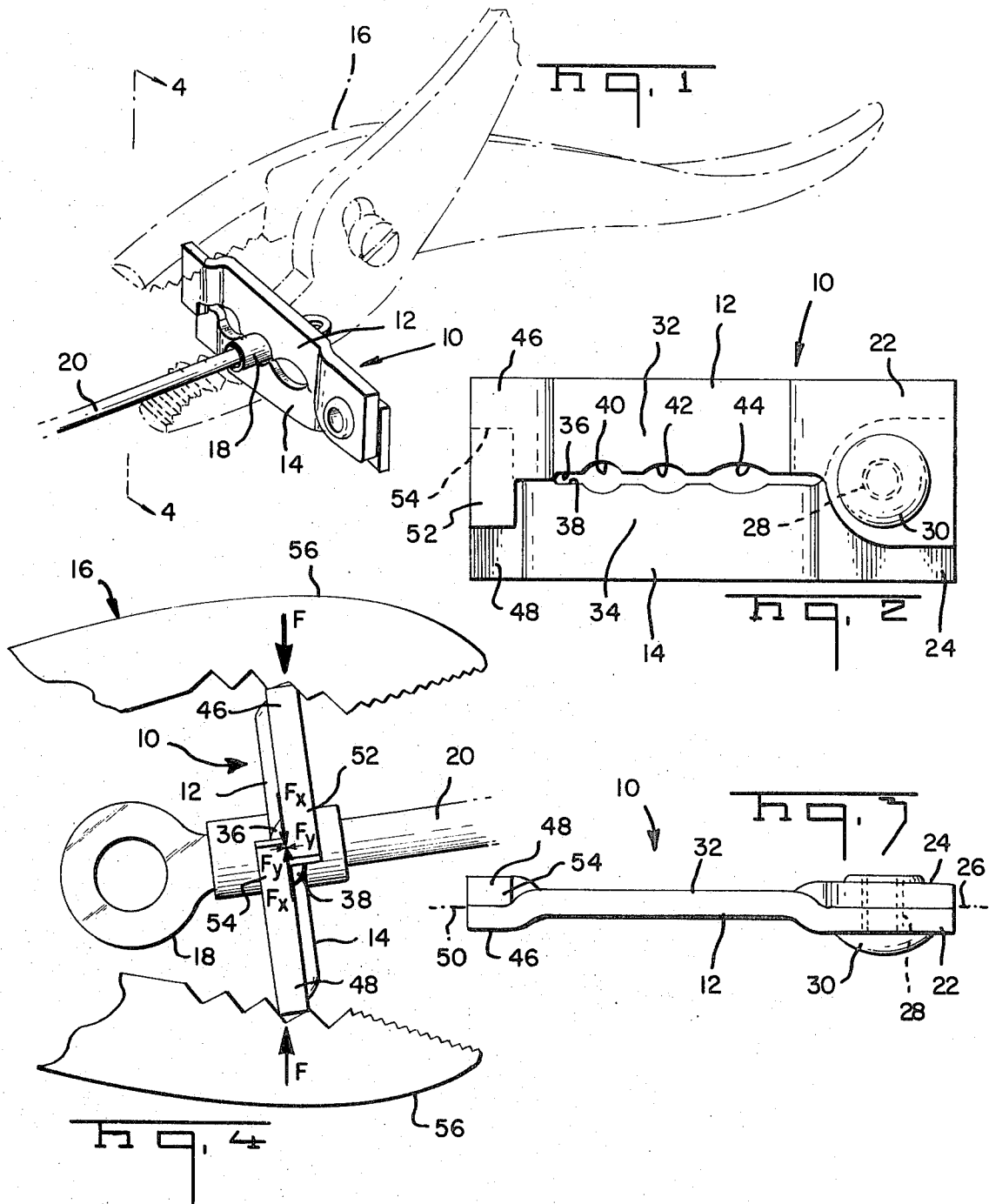
Attorney, Agent, or Firm—William J. Keating

[57] ABSTRACT

A crimping tool has identical stamped and formed second class levers which are pivotally joined at their first ends so that a pair of pliers or the like may be used to apply compression force at the opposite free ends to cause the levers to pivot toward each other. The levers respectively have aligned, intermediate portions which include at least one pair of dies in their opposed faces for crimping a terminal to a wire when compression force is applied at the free ends. The first ends are in over-lapping side-by-side relationship with respective coaxially aligned holes extending therethrough to receive a pin about which the levers pivot. The free ends are respectively misaligned and include overlapping alignment tabs so that when the tool is oriented with respect to the pliers in any position which will cause the levers to pivot toward each other, the compression forces are resolved in a direction to produce sliding contact between the tabs and the free ends to maintain the intermediate portions of the tool in alignment throughout crimping.

8 Claims, 4 Drawing Figures





1

CRIMPING TOOL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a crimping tool and more specifically to an improved crimping tool to be used in conjunction with a pair of pliers or the like.

2. Description of the Prior Art

It has heretofore been desirable when crimping a limited number of terminals to wires to use a simple plier or more complicated type hand tool. However, when crimping is limited to home use, it has been done so infrequently and in such small numbers that the home user has often chosen not to make the investment that is necessary to purchase the requisite tool. Notwithstanding the failure to obtain a proper crimping tool, crimping the terminal has nevertheless been attempted with a common, ordinary pair of pliers. However, these attempts have generally resulted in an improper mechanical and electrical bonding of the wire and terminal since the terminal is specifically designed to be crimped by a crimping tool.

One attempt to provide a less expensive crimping tool for industrial and home use was made in U.S. Pat. No. 2,774,269, the disclosure of which is incorporated herein by reference thereto. This prior art patent disclosed a pair of pivotally connected second class levers having no integral means for applying compression force but was intended to be used in conjunction with a vice or hammer. The disclosed structure for this prior art crimping tool included at least eight parts which were essential to provide the symmetry and rigidity that was required to maintain the levers in alignment when the tool was subjected to the large crimping forces that are required in some industrial uses. Although relatively small in comparison to what had theretofore been utilized to produce these large crimping forces, this crimping tool was nevertheless larger, more complicated, more rugged, and, therefore, more expensive than was necessary for smaller wire and terminal sizes which are typically found in home use and which do not require such large crimping forces.

SUBJECT OF THE INVENTION

The crimping tool of the present invention eliminates the deficiencies of the crimping tools which were available heretofore but were generally unsuitable for less frequent home use.

It is, therefore, an object of the present invention to provide an improved crimping tool having a minimal number of parts which is applicable for home use when used in conjunction with a compression-exerting tool.

It is another object to provide an improved crimping tool of the type described which is primarily made of inexpensive stamped and formed members which include crimping dies and means for maintaining the crimping dies in alignment during crimping.

To accomplish these and other objects, the disclosed improved crimping tool is of the type having a pair of stamped and formed second class levers which are joined at their first ends for pivotal movement toward each other when a compression-exerting tool applies force at their opposite free ends. The levers include aligned intermediate portions which are movable in a first plane that longitudinally bisects each of them and which have at least one pair of dies in their opposed

2

faces. The pair of dies are capable of receiving a terminal therein for crimping the terminal to a wire by the application of force with the compression-exerting tool.

The improvement includes having the first ends of the levers disposed in over-lapping side-by-side relationship to define a second plane therebetween which is generally parallel with the first plane. Each of the first ends has a hole extending therethrough which holes are coaxially aligned and disposed generally perpendicularly with respect to the second plane. A fastening means extends through the holes for pivotally joining the first ends of the levers. The free ends of the levers are disposed generally parallel to each other and displaced one from the other at opposite sides of a third plane defined therebetween which third plane is generally parallel to the first and second planes. At least one of the free ends has an integral alignment tab extending coplanarly therefrom which is disposed in over-lapping sliding contact with the other free end along the third plane, so that the displacement of the free ends allows the crimping tool to be oriented with respect to the compression-exerting tool in any position at which the compression-exerting tool forces the levers toward each other and thereby causes the application of force on the free ends to be in a direction to intersect the third plane at a small acute angle with respect to the third plane and each of the free ends to be respectively forced toward the third plane to cause the integral alignment tab to maintain the intermediate portions in alignment during crimping of the terminal.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a crimping tool forming the preferred embodiment of the invention which view includes a wire and terminal to be crimped and a pair of pliers shown in phantom,

FIG. 2 is a front view of the crimping tool;

FIG. 3 is a top view of the crimping tool; and

FIG. 4 is a view of the crimping tool as seen along line 4-4 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, there is shown at 10 in FIG. 1 a crimping tool forming the preferred embodiment of the present invention which includes a pair of identical stamped and formed levers 12, 14. Compression force is applied to the levers 12, 14 by a pair of pliers 16 so that a terminal 18 disposed between the levers 12, 14 may be crimped to a wire 20.

As better seen in FIGS. 2 and 3, levers 12, 14 respectively include first ends 22, 24 which overlap to define a plane 26 therebetween. Each of the first ends 22, 24 includes a hole 28 extending therethrough which is perpendicular to the plane 26. The holes 28 are coaxially aligned to receive a rivet 30 therein which pivotally secures the first ends 22, 24, and thus the levers 12, 14, one to the other.

Integral with and extending outwardly from the first ends 22, 24 are respectively intermediate portions 32, 34 which are coplanarly aligned with each other and with the plane 26. The intermediate portion 32 of the lever 12 includes an edge 36 which is adjacent to and faces a corresponding edge 38 of the intermediate portion 34 of the lever 14. The edges 36, 38 respectively include one of a pair of mating crimping dies 40, 42 and

44. The dies 40, 42 and 44 are each respectively designed to crimp a particular range of terminal and wire sizes which together provide the total range of sizes contemplated with the use of the crimping tool 10.

Integral with and extending generally outwardly from the intermediate portions 32, 34 are free ends 46, 48 of the levers 12, 14. In the preferred crimping tool 10, the free ends 46, 48 are misaligned with each other in the same direction as their corresponding first ends 22, 24 to define a plane 50 therebetween which is coplanar with the plane 26 of the first ends 22, 24. the free end 46 extends coplanarly beyond the edge 36 of the lever 12 generally toward the lever 14 to provide an alignment tab 52. The free end 48 of the lever 14 similarly includes an alignment tab 54 so that there is some overlapping of the free ends 46, 48 at the plane 50 when the terminal 18 is positioned within the appropriate pair of dies 40, 42, or 44 and before an appreciable amount of force has been applied in deforming the terminal 18.

It is essential to obtain consistent, reliable crimping for the intermediate portions 32, 34 and thus the dies 40, 42 and 44, to be maintained in alignment throughout the application of force to the levers 12, 14. Although showing the preferred orientation of the crimping tool 10 within the pliers 16, FIG. 4 shows how the configuration described hereinabove is utilized to obtain this objective. The bared end of the wire 20 is inserted into the terminal 18 which is in turn positioned between the appropriate dies 40, 42 or 44 of the levers 12, 14. The crimping tool 10 is then positioned between a pair of jaws 56 of the pliers 16 so that compression forces F will be applied to the tool 10 at the free ends 46, 48. If the tool 10 is to be held in a static position between the jaws 56, the forces F can only be applied to the tool 10 equally in alignment and toward each other. Because of the misalignment of the free ends 46, 48, the forces F will by necessity, be in a direction which will intersect the plane 50 at a small acute angle with respect to the plane 50. The forces F will then produce within the tool 10 two pair of opposing component forces Fx and Fy which combine to crimp the terminal 18 and to maintain the intermediate portions 32, 34 in alignment. The forces Fx are aligned with the intermediate portions 32, 34 and the dies 40, 42 and 44 to produce the desired force on the terminal 18 if the intermediate portions 32, 34 are maintained in alignment throughout the crimping. The forces Fy maintain this alignment by forcing the misaligned free ends 46, 48 and their respective alignment tabs 52, 54 into sliding contact at the plane 50. Since the forces Fx and Fy are proportional, the force Fy will increase to insure continued sliding contact of the free ends 46, 48 which will maintain proper alignment of the intermediate portions 32, 34 as the forces F and Fx are increased as the crimping operation progresses and nears its completion to insure complete and adequate crimping of the terminal 18 to the wire 20.

What is claimed is:

1. An improved crimping tool of a type having a pair of second class levers stamped and formed from a sheet of metal, said pair of levers being joined at their first ends for relative pivotal movement, each of said levers having an opposite free end at which a compression-exerting tool applies force to said levers to cause them to pivot toward each other, said levers having aligned

intermediate portions movable in a first plane which longitudinally bisects each of said intermediate portions, said intermediate portions having at least one pair of dies in opposed faces of said intermediate portions, said pair of dies capable of receiving a terminal herein for crimping said terminal to a wire by an application of said force with said compression-exerting tool, which improvement comprises:

said first ends of said levers disposed in overlapping side-by-side relationship to define a second plane therebetween, said second plane being generally parallel with said first plane, each of said first ends having a hole extending therethrough which said holes are coaxially aligned and disposed generally perpendicularly with respect to said second plane; fastening means extending through said holes for pivotally joining said first ends of said levers;

said free ends of said levers disposed generally parallel to each other and displaced one from the other at opposite sides of a third plane defined therebetween, said third plane being generally parallel to said first and second planes; and

at least one of said free ends having an integral alignment tab extending coplanarly therefrom, said tab being disposed in overlapping sliding contact with the other of said free ends along said third plane, whereby said displacement of said free ends allows said crimping tool to be oriented with respect to said compression-exerting tool in any position at which said compression-exerting tool forces said levers toward each other and thereby causes said application of said force on said free ends to be in a direction to intersect said third plane at a small acute angle with respect to said third plane and each of said free ends to be respectively forced toward said third plane to cause said integral alignment tab to maintain said intermediate portions in alignment during crimping of said terminal.

2. A crimping tool as set forth in claim 1, wherein said first, second and third planes are generally coplanar.

3. A crimping tool as set forth in claim 2, wherein: said first end and said free end of a first of said pair of levers are disposed at one side of said first plane.

4. A crimping tool as set forth in claim 3, wherein: each of said free ends includes said integral alignment tab and each of said tabs is disposed for said overlapping sliding contact with said tab of said other free end and said other free end.

5. A crimping tool as set forth in claim 4, wherein: said first of said pair of levers is identical to a second of said pair of levers.

6. A crimping tool as set forth in claim 2, wherein: said first end and said free end of a first of said pair of levers are disposed at opposite sides of said first plane.

7. A crimping tool as set forth in claim 6, wherein: each of said free ends includes said integral alignment tab and each of said tabs is disposed for said overlapping sliding contact with said tab of said other free end and said other free end.

8. A crimping tool as set forth in claim 7, wherein: said first of said pair of levers is identical to a second of said pair of levers.

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