

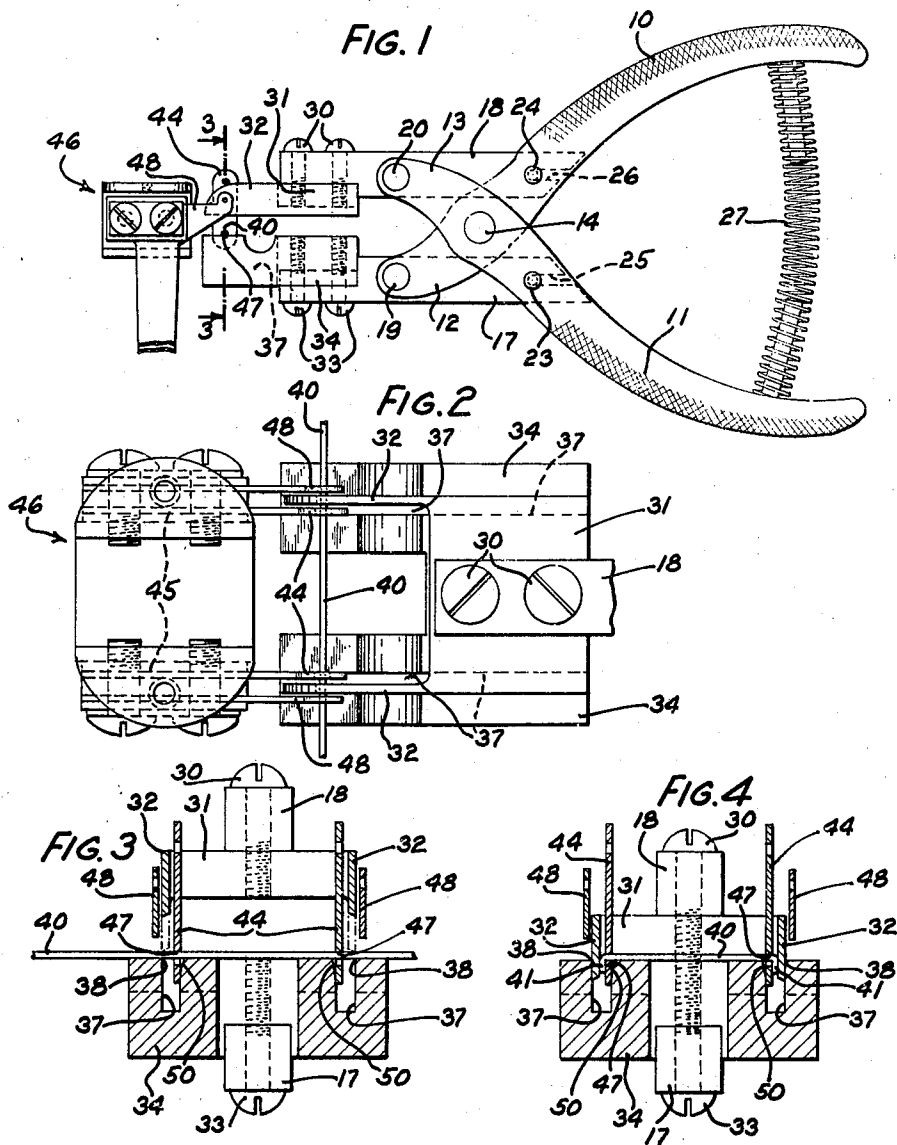
Oct. 8, 1940.

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2,217,486

TOOL

Filed Sept. 7, 1939



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UNITED STATES PATENT OFFICE

2,217,486

TOOL

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Application September 7, 1939, Serial No. 293,692

4 Claims. (Cl. 153—1)

This invention relates to tools, and more particularly to multiple shearing and forming pliers.

Telephone panel dial apparatus employs a large number of multiple brush units which include closely arranged contact springs having apertured terminals electrically connected together by a strap wire inserted through the apertures, the ends of the wire being soldered to the terminals. Heretofore, in assembling such units one operation comprised inserting a strap wire through the terminal apertures and soldering the ends thereof to the terminals at the apertures, the operator being provided with a supply of strap wires previously cut to length. The brush units were thereafter mounted on a conveyor assembly line for subsequent assembling operations. This practice did not lend itself to complete conveyor line assembly and, furthermore, did not provide an efficient and practical attachment of the strap wires to the terminals by a single operator at a bench position.

An object of this invention is the provision of an efficient and practical hand tool for multiple shearing and forming a strand to produce a predetermined length of strand having angle end portions in a single operation of the tool.

In attaining this object, there is provided in one embodiment of the invention a pair of pivoted handles upon which are pivotally carried jaws arranged for parallel movement, one of the jaws supporting a pair of spaced cutters having their outer sides cooperating with associated shearing edges formed on slots in the other jaw, the inner sides of the cutters cooperating with the outer faces of the terminals to turn the sheared ends of the strap wire and abut them adjacent the outer faces of the terminals with sufficient tension to hold them thereto, the terminals being entered in the slots.

Other objects and features of this invention will more fully appear from the following detailed description, taken in conjunction with the accompanying drawing, in which—

Fig. 1 is a side view of a multiple shearing and forming pliers embodying the features of the invention showing the jaws in the open position and associated with a multiple brush unit, which is shown fragmentarily and with a strap wire in position for shearing and forming;

Fig. 2 is a fragmentary enlarged plan view of the left end of Fig. 1;

Fig. 3 is an enlarged vertical section, taken on the line 3—3 of Fig. 1, and

Fig. 4 is a view similar to Fig. 3 after an actuation of the jaws showing the strap wire after

being sheared, formed and abutted against the terminals under tension ready to be soldered thereto.

Referring to the drawing, 10 and 11 are handle levers having their effective lever portions 12 and 13 or inner ends, respectively, bifurcated and pivotally connected together at 14. Mounted on the effective lever portions 12 and 13 of the handle levers are jaw members 17 and 18, respectively, which are held in parallel relation to each other by pivots 19 and 20 and studs 23 and 24 carried by the effective lever portions and the handle levers, respectively. The pivot 19 carried by the lever portion 12 carries the jaw member 17 adjacent one end and the opposite end of the jaw member is slotted, as indicated at 25, for engagement with the stud 23 carried by the handle lever 11. In like manner, the pivot 20 carried by the lever portion 13 carries the jaw member 18 adjacent one end and the opposite end of the jaw member is slotted, as indicated at 26, for engagement with the stud 24 carried by the handle lever 10. Due to the described arrangement and construction the pivotal movement of the handle levers 10 and 11 from an open to a closed or operative position or vice versa is ineffective to change the parallel relation of the jaw members 17 and 18. For yieldingly holding the handle levers 10 and 11 normally apart there is provided a compression spring 27 having opposite ends thereof surrounding and supported upon pins carried by the levers. The pins also serve to limit the movement of the jaw members 17 and 18 towards each other by the free ends of the pins abutting each other in the closed position of the jaw members (Fig. 4).

Attached by screws 30 to a bottom recessed surface of the jaw member 18 is a member 31 which is channel shaped in cross-section along that portion attached to the jaw member while that portion to the left thereof, as viewed in Figs. 2 and 3, is bifurcated. The furcations of the bifurcated portion of the member 31 which are continuations of the depending side arms of the member provide a pair of cutting or shearing blades 32, which are rounded at their free end edges. Secured by screws 33 to an upper recessed surface of the jaw member 17 is a member 34 which is channel shaped in cross-section along that portion secured to the jaw member while that portion to the left thereof, as viewed in Figs. 1 and 2, below the bifurcated portion of the member 31 is also bifurcated. The upper surfaces of the furcations of the bifurcated por-

tion of the member 34, which are continuations of the upwardly extending side arms of the member, are slotted as indicated at 37, into which slots the shearing blades 32 move in the operation of the tool to an extent shown in Fig. 4. Outer sides of the slots 37 are arranged in the plane of the outer sides of the shearing blades 32 and upon movement of the blades into the slots, edges 38 of the slot sides cooperate with the blades to shear a predetermined length of strap wire 40 which may extend from a continuous supply (not shown).

The operation of the described embodiment of tool for cutting the strap wire 40 from a supply thereof, forming right angle end arms 41 thereon (Fig. 4) and pressing them closely against spaced extending terminal portions 44 of contact springs 45 of a multiple brush unit 46 in a single operation of the tool is as follows: The brush unit 46 is preferably held in a suitable jig (not shown) with the extending contact spring terminal portions 44 formed with apertures 47 for receiving the strap wire 40 directed toward the operator. The particular brush unit illustrated is also provided with another set of contact springs having terminal portions 48 which are not connected by a strap wire and the tool is so designed that no interference is had therefrom in the operation of the tool. The operator then threads the free end of the strap wire extending from a supply through the terminal apertures 47 leaving a suitable length of the wire at the free end thereof which extends a suitable distance past the right slot 37 of the member 34, as viewed in Fig. 3, to provide the angle end arms 41 thereon with a minimum wastage of wire when the strap wire is severed and formed.

The tool is now advanced toward the terminal portions 44 to enter the same in the slots 37 and between the inner sides of the shearing blades 32, the width of the slots being such that the inner sides of the terminal portions 44 are in the plane of the inner sides of the slots and the outer sides of the terminal portions are spaced from the inner sides of the shearing blades a distance substantially equal to the diameter of the strap wire 40. The inner sides of the slots 37 are slightly relieved as indicated at 50 to facilitate the entrance of the terminal portions 44 into position in the slots. The strap wire 40 threaded through the apertures 47 in the terminal portions 44, when the tool has been advanced to operative position relative to the brush unit, engages and extends across the upper surfaces of the slotted furcations of the member 34, as clearly shown in Figs. 1 and 3. Upon the operator moving the handle levers 10 and 11 together the shearing blades 32 move downwardly toward the strap wire 40, which resists any tendency of the member 34 upon which the wire rests to move upwardly. The blades 32 in entering the slots 37 cooperate with the slot edges 38 to first cut the strap wire 40 to a predetermined length and in the continued downward movement of the blades the length of wire extending outwardly from each of the terminal portions 44 is bent downwardly to form the right angle end arms 41 which are pressed closely against the outer surfaces of the terminal portions, as shown in Fig. 4. Upon the operator releasing pressure upon the handle levers 10 and 11 the spring 27 returns the handle levers and the shearing blades and slotted member 34 to their normal positions.

From the foregoing description, it will be apparent that an efficient and practical multiple

shearing and forming pliers is provided having means for accurately shearing to a predetermined length a wire which has been threaded through apertured spaced members, forming angle end portions on the wire and pressing them against the members in a single operation of the pliers.

It will be understood that the embodiment herein described is merely illustrative of the invention and one application thereof, the invention being limited only by the scope of the appended claims.

What is claimed is:

1. A tool for multiple shearing and forming a strand comprising a pair of opposed jaws relatively movable toward and away from each other for receiving strand therebetween, one of said jaws having a plurality of spaced die formations each having a pair of predeterminedly spaced surfaces one of which terminates in a shearing edge, a plurality of shearing blades on the other jaw arranged for entrance into said die formations and cooperating with said shearing edges for shearing a predetermined length of strand extending between the die formations and bending sheared end portions of said length of strand into the die formations to form angle ends thereon, the shearing and forming operations being effected in a single relative movement of the jaws toward each other, and means for relatively moving the jaws toward each other.

2. A tool for multiple shearing and forming a strand comprising a pair of pivotal handles, a pair of jaws for receiving strand therebetween, means operatively connecting said jaws to said handles for parallel movement toward and away from each other upon said handles being actuated, one of said jaws having a plurality of spaced die formations each having a pair of predeterminedly spaced surfaces one of which terminates in a shearing edge, a plurality of shearing blades on the other jaw arranged for entrance into said die formations and cooperating with said shearing edges for shearing a predetermined length of strand extending between the die formations and bending sheared end portions of the length of strand into the die formations to form angle ends thereon, the shearing and forming operations being effected in a single actuation of said handles.

3. A tool for shearing a predetermined length of strand from a supply thereof threaded through apertures in spaced terminals of electrical contacts and bending sheared end portions of said length of strand to form angle ends thereon and pressing them against said terminals comprising a pair of opposed jaws relatively movable toward and away from each other, one of said jaws having a pair of spaced die formations each having a pair of predeterminedly spaced surfaces for receiving said apertured terminals, the outer pair of surfaces terminating in shearing edges, a plurality of shearing blades on the other jaw arranged for entrance into said die formations and cooperating with said shearing edges for shearing from the strand supply a predetermined length of strand extending across the die formations and threaded through the apertured terminals arranged to abut the inner pair of surfaces of the die formations, and means for relatively moving the jaws toward each other to shear the strand and bend the sheared end portions thereof into the die formations between opposed surfaces of the blades and the terminals to form angle ends on the strand and press them against

the terminal surfaces in a single relative movement of the jaws toward each other.

4. A tool for shearing and forming a strand carried by and extending from spaced projecting
5 portions of an article comprising a jaw having shearing means thereon, and a jaw for positioning said strand for shearing and forming, said
latter jaw having die formations each having a pair of predeterminedly spaced surfaces for receiving the projecting spaced article portions, the
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outer pair of surfaces terminating in shearing edges for cooperation with the shearing means on the other jaw to shear a definite length of strand and bending sheared end portions thereof into the die formations to form angle ends thereon arranged between opposed surfaces of the
5 shearing means and the article portions in a single relative movement of the jaws toward each other.

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