May 12, 1936. W. H. PAGENKOPF ET AL 2,040,330

STRAND HANDLING DEVICE

Filed Jan. 10, 1935

FIG. 1

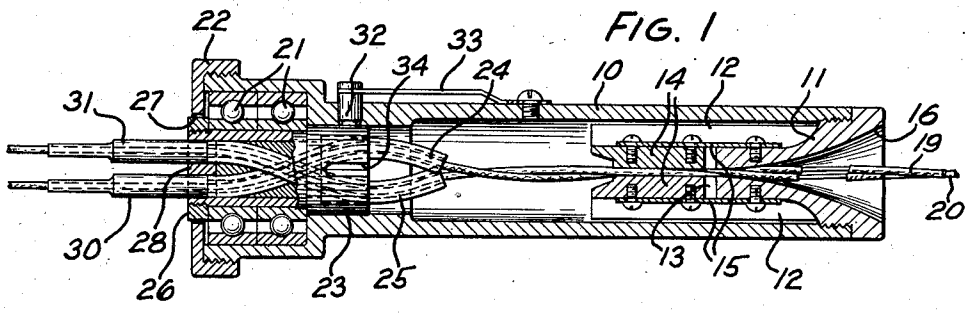
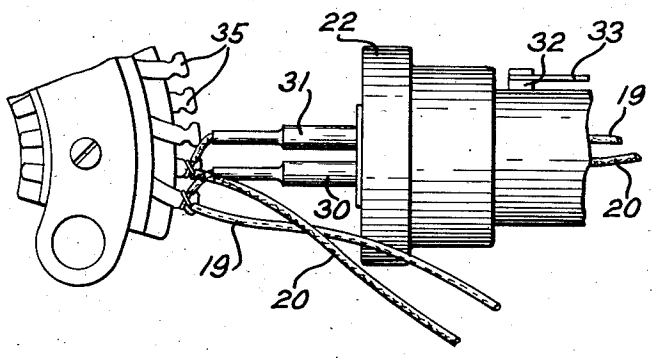


FIG. 2



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Patented May 12, 1936 2,040,330

UNITED STATES PATENT OFFICE

2,040,330

STRAND HANDLING DEVICE

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Application January 10, 1935, Serial No. 1,164

9 Claims. (Cl. 140—119)

This invention relates to a strand handling device and more particularly to a hand tool for wiring terminals.

An object of the invention is to provide a simple and efficient hand tool for wiring step-by-step bank assemblies.

In accordance with the object, one embodiment of the invention contemplates a hand tool for simultaneously applying two wires to spaced terminals comprising a handle having a rotatable member provided with two tubes through which the wires to be applied to the terminals may pass, and manually operable means for stopping the rotation of the rotatable member during the application of the wires.

Other objects and advantages will be apparent from the following detailed description taken in conjunction with the accompanying drawing, wherein

Fig. 1 is a longitudinal sectional view of the hand tool, portions thereof being shown in elevation; and

Fig. 2 is a fragmentary view of the hand tool illustrating the manner in which the wires are applied to the terminals of an article.

Referring now to the drawing wherein like reference numerals designate similar parts, numeral 10 designates a hollow handle having threadedly disposed in one end thereof a wire gripping unit 11. The unit 11 is circular in general contour and has grooves 12 cut in diametrically opposite portions thereof, these grooves being connected at 13 for receiving gripping members 14. The gripping members 14 are substantially square in cross-section and are supported by flat springs 15 secured to the inner walls of the grooves 12, as illustrated in Fig. 1. A conical shaped aperture 16 in the unit 11 provides a passageway for wires 19 and 20 which are to be threaded through the hand tool as hereinafter described.

The other end of the handle 10 is enlarged for receiving ball bearings 21 of a rotatable unit, the outer ball races of which are firmly held in this enlarged portion of the handle by a cap 22 which is threadedly secured to the enlarged portion of the handle. The inner rotatable ball races of the bearings 21 are fixed together by mounting them on the reduced portion of a sleeve 23 and placing a collar or nut 26 on the threaded end of the sleeve to firmly hold the ball races thereon. The collar rotates in the opening 27 in cap 22. Extending through the sleeve 23 are tubes 24 and 25 which are spiral in general formation and extend into the handle 10 a slight distance to a position where their inner ends are closely adjacent. These tubes may be secured against displacement in any desired manner. In the present instance the tubes 24 and 25 are secured in their respective positions by partially or completely filling the sleeve with solder. A plug 28 disposed in the sleeve 23 is apertured at spaced positions for receiving and rigidly holding wire guides 30 and 31 which have apertures therein communicating with the apertures in the tubes 24 and 25, respectively, so that the wires 19 and 20 may be fed therethrough. The end portions of the wire guides are reduced in cross-section so that the wires passing therethrough may be readily applied to terminals. The reduced end portions of the guides 30 and 31 have an internal bore of such a size as to snugly fit over the insulation on the wire and exert a slight pressure thereon and the enlarged portion of the guides have a larger bore. Slidably disposed in an aperture in the handle 10 is a stop pin or plunger 32 resiliently supported by a flat spring 33 and having its inner end V-shaped and receivable in a V-shaped groove 34 in the sleeve 23 for holding the rotatable unit against rotation when desired.

In Fig. 2 a fragmentary portion of a step-by-step bank assembly is shown having rows of spaced terminals 35, the terminals of one row being staggered with respect to the terminals of the adjacent rows so that a plan view of the bank assembly will show the terminals of one row being positioned between the terminals of another row or adjacent to the row. The wires 19 and 20 are insulated and the insulation at spaced positions or at predetermined lengths is removed from each wire, leaving bare spaces of sufficient length to wind around the terminals 35. These wires are also twisted as illustrated in Fig. 1 prior to the time they are threaded through the hand tool.

In using the hand tool to apply the wires 19 and 20 to the terminals 35, the hand tool is placed in the hand of the operator in such a position that the thumb may be placed upon the plunger 32. The plunger 32 is allowed to remain in its normal position shown in Fig. 1 as the hand tool is moved longitudinally with respect to the wires 19 and 20.

For the purpose of illustration, let it be assumed that one set of bare portions of the wires 19 and 20 are secured to two of the terminals, as illustrated in Fig. 2. The hand tool is then drawn away from the terminals to draw the wires through the tool until the next bare portions appear adjacent the wire guides 30 and 31.

In wiring a terminal bank wire is used that is twisted in pairs and, therefore, during this movement of the tool relative to the wires, the wires in passing through the tubes 24 and 25 will cause this portion of the rotatable unit, that is the tubes 24 and 25, the rotatable ball races of the bearings 21, the sleeve 23 and the wire guides 30 and 31, to rotate due to the twist in the wires at the inlet to the guides, thus the twist originally in a pair of wires is restored to the pair of wires at the outlet of the guides, the twist extending from the terminals to the ends of the wire guides. When the bare portions of the wires appear at the ends of the wire guides 30 and 31, the operator presses downwardly upon the plunger 32 and when the V-shaped groove 34 is moved into registration therewith the plunger will hold the rotating unit against further rotation and will position the wire guides 30 and 31 so that they may readily apply the adjacent bare portions of the wires upon the next set of terminals. The hand tool is then moved to a position adjacent the next set of terminals and the wire guides 30 and 31 are moved in somewhat circuitous paths about their respective terminals as, for example, in a clockwise direction to bring the wires from above the terminals around through the right-hand notches therein, under the terminals, up through the left-hand notches therein and over the terminals, as illustrated in Fig. 2, so as to form locking loops of the wires upon the terminals. This particular system of wiring is merely illustrative and it may in some cases be convenient to reverse the direction of the path of movement of the tool and have the leads cross underneath the terminals. When the wires have been attached to a set of terminals, plunger 32 is released and as the hand tool is moved away from the terminals and relative to the wires 19 and 20, the rotatable unit is again caused to rotate by the twisted wires passing through the spiral tubes 24 and 25 until the next bare portions of the wires appear at the ends of the wire guides 30 and 31. This operation is continued until the bare portions of the wires are secured to the various terminals of the bank assembly, the wire guides 30 and 31 being spaced so that two terminals may be wired simultaneously and the wire between each set of terminals twisted in the same manner as they were before being fed through the hand tool. The gripping members 14 with their resilient mountings 15 serve as brakes for the wires 19 and 20. As stated above, the reduced end portions of the guides 30 and 31 have an internal bore of such a size as to snugly fit over the insulation on the wire and exert a slight pressure thereon and the enlarged portion of the guides have a larger bore. The purpose of this is that when a bare portion of the wire to be applied is passing through the reduced portion of the guide, the shoulder formed on the wire by the beginning of the next insulated portion engages the throat of the small bore and produces a sensible retardation of the wire to apprise the operator that the end of the bare portions are about to appear at the outlet of the guides so that the hand tool may be stopped readily when the bare portions of the wires have fully emerged at the ends of the wire guides 30 and 31.

After the wires are attached to a terminal bank, they are soldered in a manner well known in the art and the precedure in the construction of terminal banks from this point on may follow conventional practice.

It will be understood that the nature and embodiments of the invention herein described are merely illustrative and that many changes and modifications may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A hand tool comprising a handle through which strands of material may pass, strand guides mounted in the handle to be rotatable about the axis thereof and through which the strands may pass and so spaced that the strands may be simultaneously secured to spaced terminals by moving said handle to move said guides in a circuitous path therearound.

2. A hand tool comprising a handle through which strands of material may pass, strand guides mounted in the handle to be rotatable about the axis thereof and through which the strands may pass and so spaced that the strands may be simultaneously secured to spaced terminals by moving said handle to move said guides in a circuitous path therearound, and friction members carried by said handle for engaging the strands passing therethrough tending to hold said strands against movement relative to the handle.

3. A hand tool comprising a handle through which twisted strands of material may pass, an element rotatably disposed in said handle, and strand guides through which the strands may pass mounted on said rotatable element to be rotatable therewith and so spaced that the strands may be simultaneously secured to spaced terminals by moving the handle to move the guides in a circuitous path therearound, said strand guides being disposed so that the twisted strands of material may rotate said rotatable element and said strand guides to twist the strands after they are secured to the terminals.

4. A hand tool comprising a handle through which twisted strands of material may pass, an element rotatably disposed in said handle, and strand guides through which the strands may pass carried by said rotatable element and so spaced that the strands may be simultaneously secured to spaced terminals by moving the handle to move the guides in a circuitous path therearound, said strand guides being disposed so that the twisted strands of material may rotate said rotatable element and said strand guides to twist the strands after they are secured to the terminals, and means for selectively holding said rotatable element against rotation.

5. A hand tool comprising a handle through which twisted strands of material may pass, an element rotatably disposed in said handle, strand guides through which the strands may pass carried by said rotatable element and so spaced that the strands may be simultaneously secured to spaced terminals by moving the handle to move the guides in a circuitous path therearound, means whereby the twisted strands of material may rotate said element with said strand guides to twist the strands after they are secured to the terminals, and means for selectively holding said rotatable element against rotation, and for positioning the strand guide so that the strands extending therethrough may be readily secured to the terminals.

6. A hand tool comprising a handle through which twisted strands of material may pass, an element rotatably disposed in said handle, strand guides through which the strands may pass carried by said rotatable element and so spaced that the strands may be simultaneously secured to

spaced terminals by moving the handle to move the guides in a circuitous path therearound, means whereby the twisted strands of material may rotate said element with said strand guides to twist the strands after they are secured to the terminals.

7. A hand tool comprising a handle through which twisted strands of material may pass, an element rotatably disposed in said handle comprising strand guides through which the strands may pass, said guides being spaced so that the strands may be simultaneously secured to spaced terminals by moving said handles to move said guides in a circuitous path around the terminals, and tubular members spiral in general formation communicating with said strand guides and through which the strands of material may pass, the formation of said tubular members causing rotation of said element when said handle with said element is moved relative to the strand material.

8. A hand tool comprising a handle through which twisted strands of material may pass, an element rotatably disposed in said handle comprising strand guides through which the strands may pass, said guides being spaced so that the strands may be simultaneously secured to spaced terminals by moving said handles to move said guides in a circuitous path around the terminals, and tubular members spiral in general formation communicating with said strand guides and through which the strands of material may pass, the formation of said tubular members causing rotation of said element when said handle with said element is moved relative to the strand material, the rotation of said element twisting the strands between the terminals and said guides and means for selectively stopping the rotation of said element.

9. A device for applying wires to terminals, comprising a body member having two passages through which wires may be drawn, said passages terminating in tubular extensions relatively disposed for wrapping each of two wires about a corresponding one of two terminals simultaneously.

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