

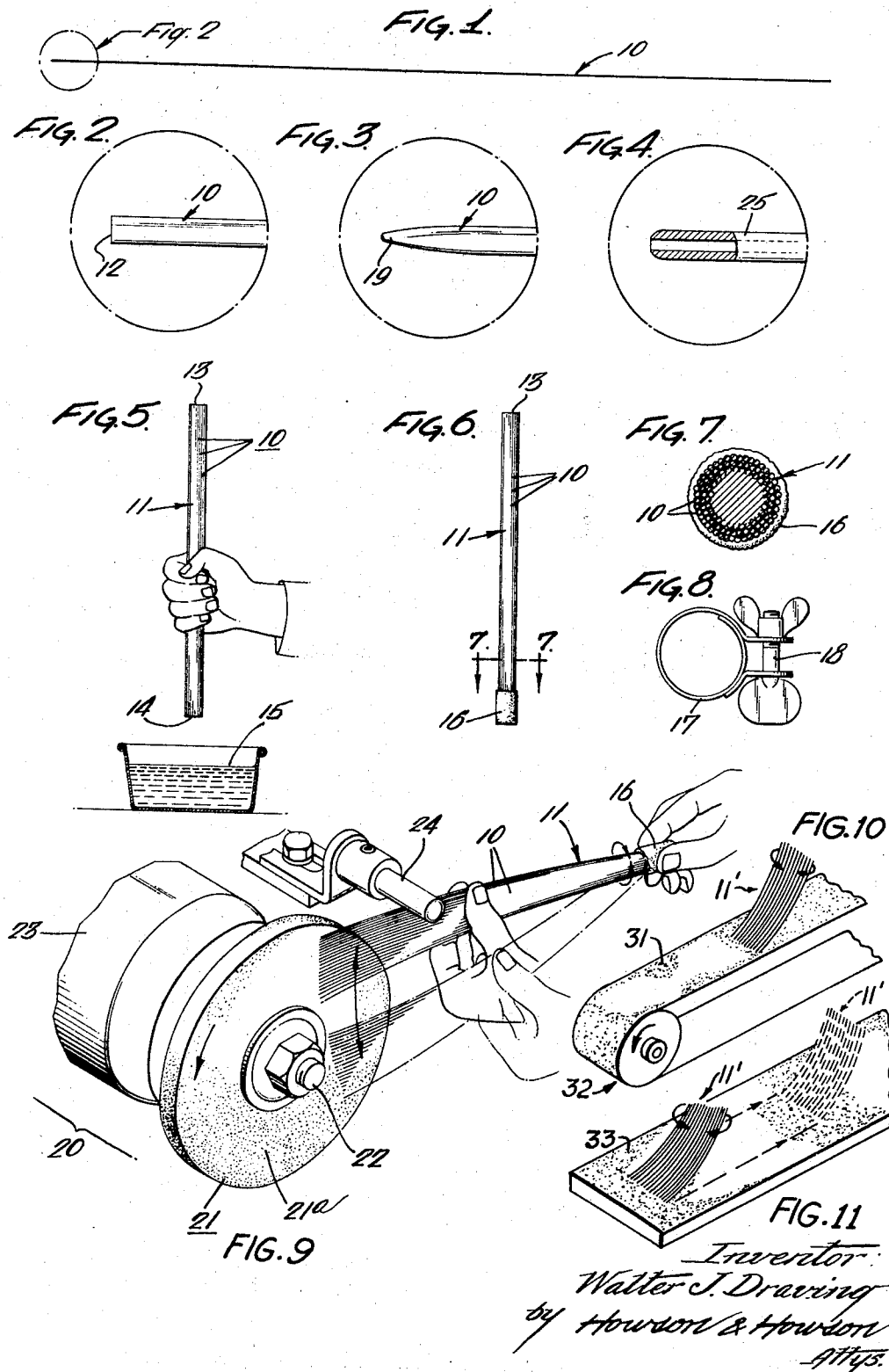
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W. J. DRAVING

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METHOD OF POINTING WIRE-LIKE ELEMENTS

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METHOD OF POINTING WIRE-LIKE ELEMENTS
Walter J. Draving, Willow Grove, Pa., assignor to Micro-Miniature Parts Corporation, Willow Grove, Pa., a corporation of Pennsylvania

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ABSTRACT OF THE DISCLOSURE

The present invention relates to a method of pointing wire-like elements and more particularly to a method of placing conical or pointed tips on a plurality of wire-like elements simultaneously.

The method of the present invention provides for the pointing of a plurality of wire-like elements simultaneously and comprises the steps of placing a plurality of wire-like elements in a bundle, clamping the bundle so as to limit relative axial movement of individual elements therein, and moving one terminal end of the bundle of elements into contact with an abrasive while causing relative movement between the bundle and the abrasive. Simultaneously with the contact of the terminal end of the bundle of elements with the abrasive, the bundle is rotated and fanned, which rotation and fanning causes conically shaped tips to be placed on the elements in the bundle.

State of the prior art

In passing small diameter wires or the like through small diameter holes in computer or memory circuit boards, many times a rough edge or snag will be present either in the aperture or on the terminal end of the wire which causes kinking in the wire when it is being threaded through an aperture. In order to facilitate the passing of the wires or wire-like elements through, for example, computer memory boards, it has been found desirable to place a pointed end on the very thin wires to provide easy threading. As may be imagined, wires of very fine diameter of, for example, approximately .001 to .010 of an inch are very difficult to point except when pointed individually which of course adds to the cost of the wire and the final product. As a matter of fact in most instances, to point each wire separately usually more than doubles the cost of the finished wire. However, the time saved in the final threading operation more than compensates even for this high cost.

In addition, small diameter tubing, i.e. tubing having an outer diameter of approximately .005 to .015 of an inch encounters the same difficulty in passing into computer circuit boards or the like. In a like manner as before, it is necessary to provide a radius on at least one terminal end of the tubing so as to facilitate threading into small diameter apertures.

In view of the above it is a principal object of the present invention to provide a method of placing needle points on a plurality of wire-like elements simultaneously.

Still another object of the present invention is to provide a method for placing conical tips on the terminal ends of a plurality of wire-like elements simultaneously, which method substantially reduces the cost of placing such points thereon, and which method may be carried out efficiently and with a concomitant saving in time over the methods heretofore used of pointing individual wire-like elements.

Still another object of the present invention is to provide a method of pointing wire-like elements which method requires a limited amount of capital and relatively

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little skill so that even the inexperienced shop technician may master the art in a relatively short period of time.

Still other objects and a fuller understanding of the invention may be had by referring to the following description and claims taken in conjunction with the accompanying drawing in which:

FIG. 1 is a plan view of a typical wire element to which a point is to be applied;

FIG. 2 is a fragmentary enlarged view showing the portion of the wire element illustrated in FIG. 1 in the dotted lines thereof and designated FIG. 2;

FIG. 3 is an enlarged profile view of the wire-like element terminal end illustrated in FIG. 2, except with a conical tip thereon, as provided by the method of the present invention;

FIG. 4 is an enlarged fragmentary profile view of a portion of a wire-like element, in the present instance a tube, and having at the terminal end thereof, a radius, as provided by the method of the present invention;

FIG. 5 illustrates one of the steps of the method of pointing a plurality of wire-like elements such as the element illustrated in FIG. 1 above;

FIG. 6 is a view similar to FIG. 5 except with the bundle of wire-like elements clamped together to hold the wires in a bundle;

FIG. 7 is an enlarged fragmentary sectional view taken along line 7—7 of FIG. 6;

FIG. 8 is illustrative of other means to employ a method of clamping the bundle of wire-like elements as illustrated in FIG. 5;

FIG. 9 is a fragmentary perspective view illustrating the method of moving the bundle of wire-like elements into contact with an abrasive so as to provide conically shaped points on the elements contained therein;

FIG. 10 is a fragmentary schematic perspective view illustrating, for example, other apparatus which may be utilized for effecting the method of the present invention; and

FIG. 11 is a fragmentary schematic perspective view of still other apparatus by which the present invention may be practiced.

Referring now to the drawing, and especially FIGS. 1 and 5 thereof, a plurality of wire-like or wire elements 10 are placed in a bundle 11 in order to provide simultaneously, conically shaped tips on at least one end 12 of each of the wire-like elements. Depending upon the diameter of the wire elements 10, anywhere from approximately 500 to 2,000 may be placed in a bundle so that subsequent operations may be performed thereon. It should be recognized, however, that no maximum or minimum number of elements are necessary in the bundle but with an element diameter of .002 to .015 inch a bundle 11 consisting of anywhere from 500 to 2,000 has been found most convenient for ease of handling.

In accordance with the invention, after the individual elements 10 have been placed in a bundle 11 it is preferable to tap the bundle against a flat surface and perpendicular thereto so as to provide at least one end 13 of the bundle 11 (associated with the one end 12 of the wire elements 10) with a radially and relatively even end. Thereafter the bundle may be clamped at a point spaced from the one end 13 thereof so as to limit relative axial movement of individual elements in the bundle 11. For example, the other end 14 of the bundle may be dipped into a bonding agent 15, preferably a soluble one such as nail polish. As illustrated in FIG. 6 after the nail polish has dried a portion of the other end 14 of the bundle 11 will have a removable bond 16 joining adjacent elements and limiting relative axial movement thereof. It should be recognized however that other means may be utilized to clamp the bundle such as the ring clamp 17 having

tightening means 18 to permit adjustment for differences in diameters of various bundles.

Thereafter the one end 13 of the bundle 11 may be pressed into contact with an abrasive and relative movement incurred between the two to cause placement of a conical or cone-shaped point 19 (see FIG. 3) on each element 10. To this end, as illustrated in FIG. 9, a grinder 20 comprising an abrasive wheel 21 mounted on the shaft 22 of a motor 23 may be utilized to point the elements. For reasons which will become evident hereinafter, the grinder includes an upper stop 24 radially spaced and aligned with the abrasive wheel's edge.

In accordance with the invention, the one end 13 of the bundle of wire elements 11 is then brought into contact with the side surface 21a of the abrasive wheel 21 and angulated slightly from the radial plane of the wheel. It is important to note that the point of contact of the one end 13 is preferably such that the relative movement between the bundle and the wheel tends to move away from the one end 13 rather than oppose the one end. If the relative motion was such as to oppose, as may be imagined, catching and kinking of the individual elements would occur. As the one end 13 of the bundle 11 is moved into contact with the abrasive wheel 21, the bundle is rotated, and the elements fanned out so that individual elements will contact the abrasive wheel. In order to provide a smooth and even conical tip on the elements it may be desirable that the rotation be directed reciprocatorially as this prevents excessive twisting along the length of the bundle. When using a rotating wheel abrasive such as illustrated in FIG. 9, as the wheel tends to force the elements radially outward therefrom, the outward radial movement may be limited by the stop 24.

Of course other abrasive means may be utilized such as a belt abrasive 31 fittable on a conventional table type sander 32 (see FIG. 10) while fanning and rotating the elements of the bundle 11'. In addition, apparatus may be utilized for providing relative movement between the bundle and abrasive by moving the bundle 11' and fixing the abrasive 33 (see FIG. 11). However, the standard grinder has been found more than acceptable for pointing the wire-like elements 10.

The principle above described is also applicable in placing "radii" or conically tipping the terminal ends of other wire elements, for example small diameter tubing 25 such as illustrated in FIG. 4. The method of providing a radius is substantially the same as the method above set forth, the only difference being the angle of contact

between the bundle in which the tubes are held relative to the plane of the abrasive.

When a soluble bonding agent such as nail polish is used on the other end 14 of the bundle 11, it is a simple matter to remove the same with nail polish remover after the pointing operation has been completed.

Thus the present invention provides a novel and easily practiced method of pointing a plurality of wire-like elements, which method substantially reduces the cost per unit.

Although the method of the present invention has been described with a certain degree of particularity, variations of this method may be employed by others skilled in the art, but all falling within the purview of the following claims.

What is claimed is:

1. A method of pointing wire elements comprising the steps of: placing a plurality of elements into a bundle, clamping said bundle to limit relative axial movement of individual elements in said bundle, moving the terminal ends of the elements in one terminal end of said bundle into contact with, and at an angle to an abrasive surface while effecting relative movement between said terminal ends and said abrasive surface, and simultaneously therewith rotating said bundle and fanning said elements in said bundle to thereby provide conically-shaped tips thereon.

2. A method of pointing wire elements in accordance with claim 1 including the step of evening the said one terminal end of said bundle prior to clamping said bundle.

3. A method of pointing wire elements in accordance with claim 1 wherein said clamping step includes the step of applying a dissolvable bond to the other end of said bundle.

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LESTER M. SWINGLE, *Primary Examiner*.

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