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CORE MATRIX ASSEMBLY

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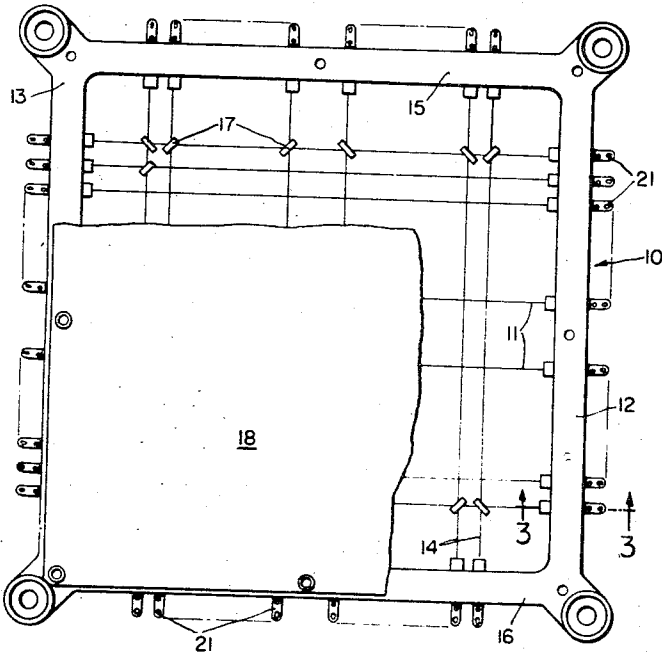


Fig. 1

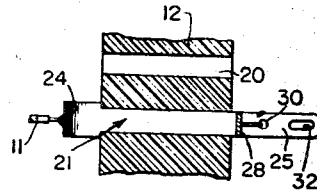


Fig. 5

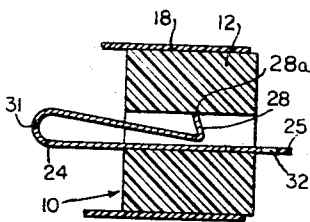


Fig. 4

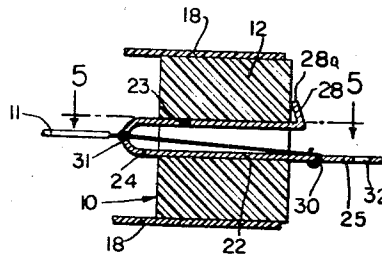


Fig. 3

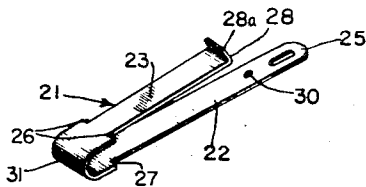


Fig. 2

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CORE MATRIX ASSEMBLY

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The present invention relates to core matrix assemblies and more particularly to a novel terminal lug for use therewith.

As described more fully hereinafter, magnetic core matrices employ extremely fine wires strung across a frame in criss-cross fashion with each pass of wire across the frame secured to terminal lugs positioned upon the frame, with magnetic cores positioned at the cross over points of the wires. While this general construction is not new, in the past, the terminal lugs used on core matrix frames necessitated feeding the fine wire through a hole or slot at an angle to its path across the frame. After the wire was fed through the opening, tension was applied and the wire and then wrapped around the terminal and solder connected thereto. Usually terminal lugs include sharp edges and the tension on the fine wires as it was being wrapped around the sharp edges of the terminal would often snap the wire, making it necessary to start the winding over again. Other difficulties of the prior art terminal lugs reside in the frequency of broken or damaged wires occurring during use of the matrices, necessitating a very difficult and expensive replacement procedure. Then too, many of the terminals are of the screw machine type which require machine operations and drilling, all of which add to the expense of these items.

An important object of the present invention is to provide core matrix assembly overcoming the above difficulties.

Another important object of the invention is to provide a novel terminal lug.

Still another object of the invention is to provide a novel terminal lug making it possible to assemble matrices of equally tensioned cross wires.

A further object is to provide terminal lugs of the aforementioned type which are self-anchoring and easily assembled in a matrix frame.

More specifically, it is an object of the invention to provide a light weight terminal lug which is readily adapted for rapid and inexpensive manufacture by mass production methods.

In the accompanying drawings:

Figure 1 is a plan view of a magnetic core memory matrix embodying one form of the invention;

Figure 2 is a perspective view on an enlarged scale of the novel terminal lug;

Figure 3 is a fragmentary sectional view taken on line 3—3 of Figure 1 showing a lug assembled in the matrix frame;

Figure 4 is a fragmentary sectional view similar to Figure 3 but showing how the lugs are assembled in the matrix frame; and

Figure 5 is a fragmentary sectional view taken on line 5—5 of Figure 3.

Referring to Figure 1 of the drawings showing a magnetic core matrix in accordance with the present invention, the numeral 10 designates an annular frame, pref-

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erably of rectangular configuration, serving as the body of the matrix assembly and including a first plurality of transverse wires 11 strung in parallel spaced relationship between frame sides 12 and 13, and a second plurality of transverse wires 14 strung in parallel spaced relationship between frame sides 15 and 16, all wires of both groups being in substantially the same plane. The two sets of wires thus form a criss-cross pattern between the opposite sides of the frame and form a matrix for supporting magnetic cores 17 at their intersections, with each of the wires functioning as a single turn for the cores associated therewith. The frame 10 is preferably molded of dielectric material and is provided with outer covers 18.

For mounting the two sets of wires 11 and 14 on the frame, each side of the latter is formed with a row of apertures 20, preferably of rectangular section and spaced to match the selected wire spacing. In particular accordance with the present invention each aperture receives a terminal lug 21 of conducting material. In assembling the matrix with terminals 21 in place about the periphery of the frame, one end of each wire 11 is connected to a terminal 21 at one side of the frame after which its free end is threaded through a row of magnetic cores 17 and then is connected to a terminal 21 at the opposite side of the frame. In the same manner one end of each wire 14 is connected to a terminal 21 at one side of the frame 10 and its free end is then threaded at right angles to wires 11, through a row of cores 17, and then is connected to a terminal 21 at the opposite side of the frame. The arrangement is such that each core 17 is positioned at the crossover points of wires 11 and 14. In other words each core 13 encircles both a wire 11 and a wire 14 and is supported by the crossed wires to form the X and Y axes of a core matrix unit.

In order to stretch each wire without breaking it, terminals 21 are of novel construction. Each terminal comprising a body formed of flexible flat strip metal reversely bent to form two parallel legs 22 and 23 spaced from each other but integrally connected at one end by a bridge 24, preferably of arcuate configuration. Leg 22 is longer than leg 23 thus to provide an extension 25, which, as seen in Figures 1 and 4, projects from the outer face of each side of the frame when the terminals are in place. Thus, with terminals 21 in apertures 20, there is provided a row of terminal projections 25 (Figure 1) at each frame side for connection thereto of selected electrical circuits. It will be noted in Figure 2 that the bridge end of each lug is of increased width to form transversely aligned shoulders 26 and 27.

Further, it should be particularly noted that the free end of leg 23 is bent outwardly, at a point spaced from its shoulders 26, a distance corresponding substantially to the thickness of a side wall of frame 10, and preferably at an angle which is acute relative to leg 23, thus to form a latch 28. When inserting a terminal 21 into its aperture 20, as seen in Figure 4, its leg 23 is flexed towards leg 22 to permit extension 25 and the retracted latch 28 to be inserted through the aperture until stopped by shoulders 26 and 27 abutting frame 10, at which instant latch 28 emerges from the aperture to snap upwardly and behind the outer frame face to lock the terminal in place, as seen in Figures 3 and 5. Because of the acute angular relation of latch 28 with leg 23, the outer edge 28a will bite into the frame wall thus to firmly anchor the terminal. The terminal is prevented from turning when in apertures 20 by the rectangular configuration thereof. Thus, with a terminal inserted in its aperture 20, the two pairs of shoulders

26 and 27 and latch 28 function to lock the lug to the frame.

For attaching the respective wires 11 and 14 to the terminals, each extension 25 is provided with a wire receiving hole 30 to which the wire is led by way of a guide hold 31 in bridge 24 to pass between legs 22 and enter hole 30 to be wrapped and soldered. Preferably extension 25 of each terminal 21 has a slot 32 for soldering attachment of a terminal of an associated circuit.

In assembling the matrix, terminals 21 are inserted and anchored in frame apertures 20 as described above. A wire 11 or 14 to be mounted in stretched condition is now inserted through guide hole 31 of a selected terminal and threaded through the space between the legs 22 and 23 and hole 30 of extension 25, and soldered in place by applying solder at the point where the wire passes through hole 31. The free end of the wire is now threaded through a row of cores 17 and then through guide hole 31 of the oppositely aligned terminal, between its legs 22 and 23 and connected to a suitable tensioning device, not shown. Preferably the applied tension is of the order of 0.2 pound. With the wire properly tensioned it is soldered to the lug where it passes through guide hole 31. Both ends of the wire are then threaded through holes 30 and wrapped around terminal extension 25 to make an untensioned mechanical connection therewith. In this way all of the wires are mounted in place under the same tension to lie in a substantially common plane forming a complete core matrix or memory plane. The peripheral projections 25 permit ready connection with associated apparatus. It should be understood, of course, that the wires may be assembled in groups rather than singly. That is, all of wires 11 may be strung through their associated terminal 21 then soldered to the terminals in side wall 13, tensioned as a group, soldered to the terminals in wall 12, after which the ends are wrapped around the terminals.

It will now be apparent that a novel core matrix has been devised wherein, novel terminals permit a straight feed of the wire so that each wire can be soldered without having to bend the wire while it is under tension. This provides a further advantage in that the danger of breaking the fine wires which heretofore had to be bent while under tension has been eliminated. Furthermore, these novel snap-in terminals can be inserted without danger of rotation so that perfect alignment of all terminals is possible. Also repair costs are kept at a minimum because in case of a broken wire or a damaged terminal the particular terminal and its associated wire can be removed and replaced without affecting the other wires and terminals of the matrix.

What is claimed is:

1. A core matrix assembly comprising, an annular frame having aligned apertures in opposite sides thereof, terminal lugs in said apertures, each of said terminal lugs comprising two legs of different lengths in substantially parallel spaced relation, a spacing bridge interconnecting

one end of said legs on the inner side of said frame and having a guide hole for a wire, the guide hole of each bridge being axially aligned with the guide hole of its respectively aligned terminal on the opposite side of said frame, means adjacent said bridge to limit the insertion of said legs in said apertures, an outwardly projecting latch on the other end of the shorter of said legs arranged to snap into contact with the outer face of said frame when the lug is inserted in said aperture from the inside of said frame, said longer leg including a portion projecting from said outer face as a connector, wires passing through said guide hole in aligned terminals and soldered under tension to said bridge to form a criss-cross pattern, and toroidal cores positioned at crossover points of said wires with said wires passing through the apertures of said cores.

2. A terminal lug for insertion in an aperture in a frame, said lug comprising a pair of resilient legs, one long and one short, positioned substantially parallel to, but spaced from each other, an arcuate bridge member interconnecting adjacent ends of said legs, abutment means at the bridged end of said legs to limit insertion of said lug in an aperture in said frame, means at the opposite end of said short leg to engage said frame in a manner cooperating with said abutment means to lock said lug in its inserted position with said longer leg projecting from said frame for connection thereto of a wire, said bridge having a guide hole for the passage therethrough of a wire, the axis of said hole extending substantially parallel with and between said legs.

3. A lug to be inserted in the aperture of a frame strip and formed by a bent elongated strip of flexible metal, said lug comprising an arcuate bridge member, a short leg extending from one side of said bridge member and having adjoining width less than that of said bridge member to form two opposite shoulders, a latch at the free end of said short leg spaced from said shoulders and projecting away from said legs and toward said bridge to engage said frame when said lug is in an aperture, and a long leg extending from the other side of said bridge member having adjoining width less than that of said bridge member to form two opposite shoulders in the plane of the shoulders on said short leg, said bridge member having a guide hole opening into the space between said legs.

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Publication II: "Proc. of the Eastern Joint Computer Conference," December 3-10, 1953, "MIT Magnetic-Core Memory," by William N. Papian, pp. 37-42, Fig. 7 on page 40 relied upon.