May 12, 1964 G. J. DAVID 3,133,270

PRINTED CIRCUITRY FOR MAGNETIC CORE MATRIX

Filed Aug. 24, 1960

FIG. 1

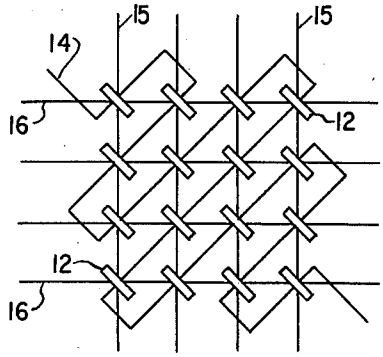


FIG. 2

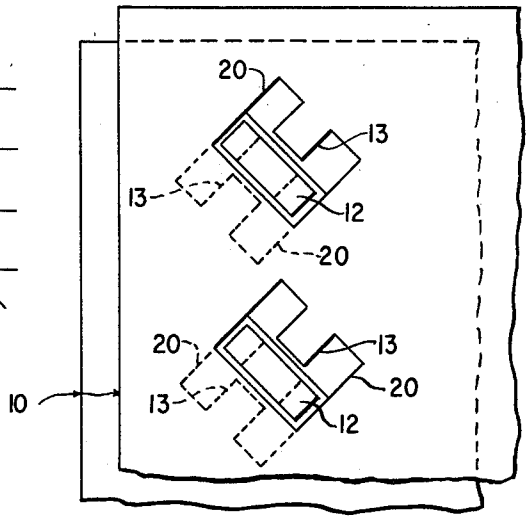
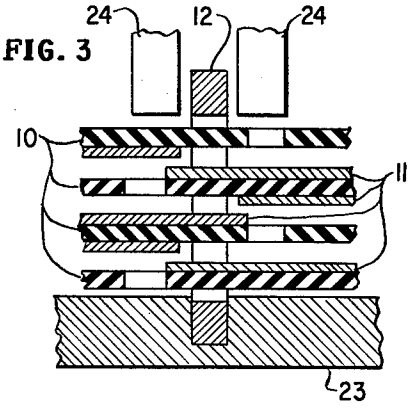


FIG. 3



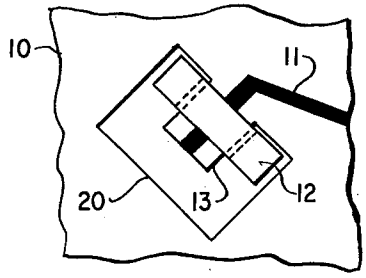


FIG. 4

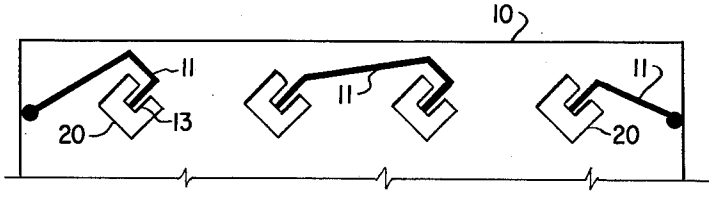


FIG. 5A

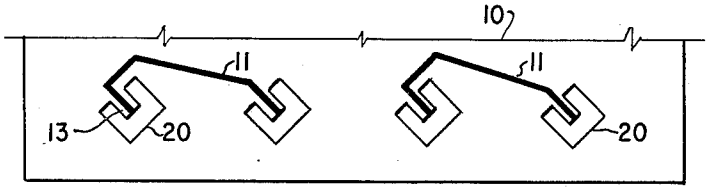


FIG. 5B

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PRINTED CIRCUITRY FOR MAGNETIC CORE MATRIX

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Filed Aug. 24, 1960, Ser. No. 51,746
4 Claims. (Cl. 340—174)

This invention relates to a memory core device and more particularly, to a printed circuit arrangement for a memory core matrix.

The primary object of this invention is to provide a printed circuit arrangement for a memory core device which requires a minimum number of soldered connections to complete the winding through the magnetic cores.

The invention is an improvement over the copending applicaton assigned to the present assignee and entitled, Method of Producing a Memory Core Array, filed by K. W. Liston and R. K. Stoehr on August 24, 1960, U.S. Serial No. 51,688. This copending application discloses a method whereby solder coated printed conductors disposed on sheets or cards made of insulating material are gapped or interrupted at each of an array of cutouts. The gaps are bridged by corresponding conductors disposed on an adajcent card which overlap the two conductor ends formed by the gap. Continuity of the conductors is made after the two overlapped conductor areas at each cutout are soldered together.

The present invention improves upon the aforedescribed disclosure by substantially reducing, for example by one-half, the number of soldered connections required to complete the windings through the cores. Instead of bridging each gap formed between an edge of a lip and an edge of the cutout with a relatively short conductor disposed on an adjacent sheet, continuity is insured by forming conductors, each extending all the way from one cutout to the next, alternately on adjacent sheets so that both ends of each of these conductors overlaps a similar conductor on the adjacent sheet. Thus there is only one overlap between adjacent conductors at each cutout and hence only one solder connection is required at each cutout instead of the two connections in the case of the copending application.

Other objects and features of my invention will become apparent from a perusal of the following detailed description taken in conjunction with the following drawing of which:

FIGURE 1 is a schematic view showing the winding arrangement through the positioned memory cores.

FIGURE 2 is a plan view showing the cards before they are moved with respect to each other, that is, before the lips thereof are inserted into the cores.

FIGURE 3 is an exploded cross-sectional view of the assembly according to the invention including the temporary core jig or core support and the posts used to press the cards together.

FIGURE 4 is a plan view showing a magnetic ring core held by means of a lip which extends at a cutout of the card.

FIGURES 5A and 5B are plan views of two cards having printed conductors disposed thereon and extending lips formed at a plurality of cutouts.

Referring now to the drawings, FIGURE 1 shows a winding arrangement for the magnetic memory device. In particular the arrangement comprises a sense winding **14**, a horizontal winding **16** and a vertical winding **15**, all of which thread, that is extend through, the array of cores **12**.

The method of assembling the core matrix which is also used in the copending application will be first described. Referring now to FIGURES 2, 3 and 4, the

cores **12** are set on end in circular depressions of a jig **23**. Cards **10** are then aligned with and laid over the positioned cores so as to be at right angles therewith. This is followed by moving the adjacent cards **10** with respect to each other so that the lips **13** of each card, which extend in opposite directions, are inserted through the core apertures and overlap each other outside of the core apertures. The thusly assembled cards are then placed under posts **24**, shown in FIG. 4. Posts **24** are the means used to exert pressure upon the sheets **10** and act directly over the overlapped area so as to give maximum effect. Heat is applied simultaneously with the pressure causing thereby the solder disposed on the overlapped portion of the adjacent conductors to flow together and form continuous conducting paths. This heat is radiated through the sheets by means of a heating element which may be an integral part of the post **24** or separate therefrom. After the pressure and heat is removed the assembly is self supporting and does not require any additional mechanical support.

More specifically the device which is assembled by the aforedescribed method comprises cards **10** each having printed conductor segments **11** disposed on at least one of its surfaces, and toroidal shape cores **12**. Cards **10** have cutouts **20** arranged to correspond with the arrangement of the cores **12**. Extending from each of these cutouts is an extending lip **13** which is the means used to hold and carry conductors **11** through the core **12**. The conductors **11** are printed on the cards **10** by any of the techniques commonly used in the art of printed circuitry. Furthermore, each of the conductors of one card extends over the lips **13** and between a given pair of cutouts. The conductors on adjacent cards also extend over the lips **13** but between alternate pairs of cutouts as more clearly shown in FIGS. 5A and 5B. In this manner the conductors of one card matches or completes the conductors of another card, thereby forming continuous electrical paths through the cores.

The cores **12** in addition to being held by the lips **13** are locked into position thereby by virtue of the fact that the lips of one sheet extend through the cores from one direction and the lips of an adjacent sheet from the opposite direction. Thus, no specific means is required to fasten down the cores **12** to the cards **10** or vice versa.

My invention has been described in detail, however, it is understood that the present disclosure has been made only by way of example and numerous changes in the detail and structure may be made without departing from the scope of my invention as hereinafter claimed.

What is claimed is:

1. A printed circuit arrangement for a memory core matrix comprising; an array of ring cores, a pluality of substantially flat sheets made of insulating material and having cutouts through which said ring cores extend in planes perpendicular to planes of the sheets, at least one of said sheets having lips extending from one side of said cutouts and protruding through said ring cores, a plurality of printed conductor segments disposed on at least one surface of said sheets over said lips and extending between alternate pairs of said cutouts, said conductor segments on one sheet being continued by other segments disposed on an opposite surface of an adjacent sheet thereby forming a continuous conducting path between and through said ring cores.

2. A printed circuit arrangement for a memory core matrix, as claimed in claim 1, wherein said lips of one sheet extend oppositely to lips of another of said sheets lying in a parallel plane so that the said ring cores are locked in position.

3. A printed circuit arrangement for a memory core matrix, as claimed in claim 2, wherein in the assembled condition of said matrix said lips of one sheet are over-

lapped by lips of an adjacent sheet outside of said ring cores.

4. A printed circuit arrangement for a memory core matrix comprising; an array of ring cores, a stack of substantially flat members made of insulating material and having spaced apertures through which said ring cores extend in planes perpendicular to planes of the said members, at least one of said members have one or more portions extending through said ring cores, a plurality of printed conductor segments disposed on at least one surface of said members over said portions and extending

between alternate pairs of said apertures, said conductor segments on one member being continued by other segments disposed on an opposite surface of an adjacent member thereby forming a continuous conducting path between and through said ring cores.

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