

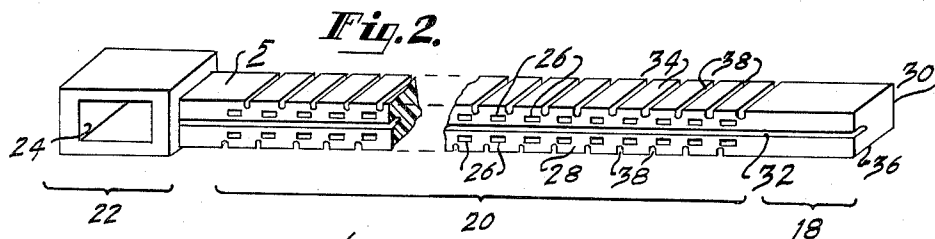
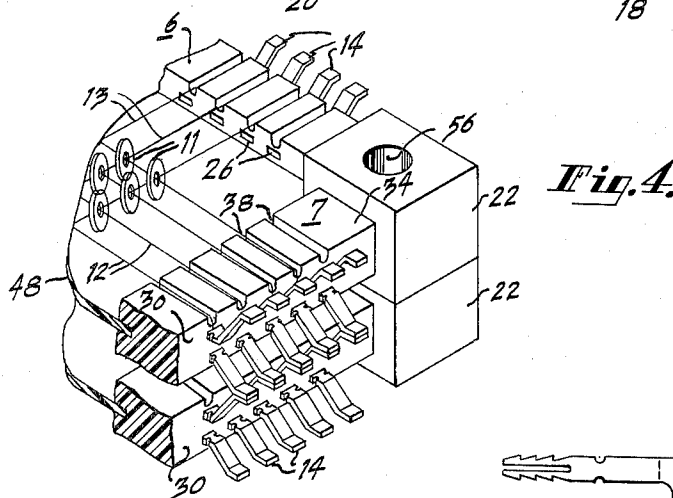
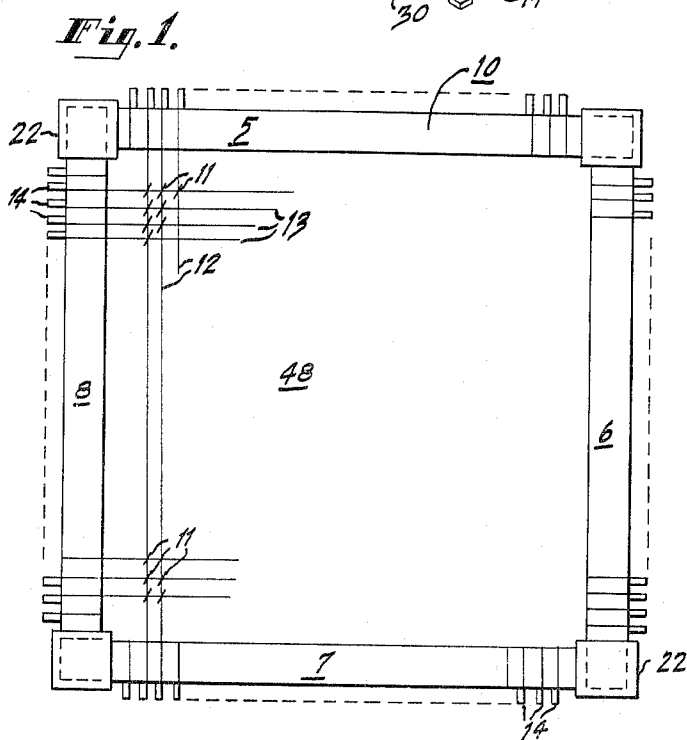
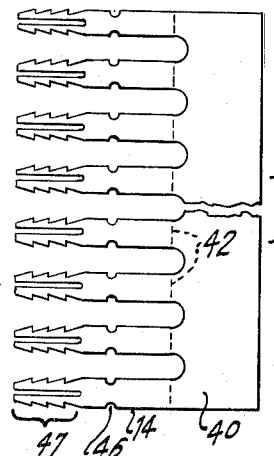
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MEMORY MATRIX ASSEMBLY WITH SEPARATE, INTERCONNECTING ARM MEMBERS

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MEMORY MATRIX ASSEMBLY WITH SEPARATE, INTERCONNECTING ARM MEMBERS

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This invention relates to memory matrix assemblies, and more particularly to assemblies of memory elements (such as magnetic cores), wires linking the memory elements, and associated structural elements.

It is a general object of this invention to provide an improved memory matrix assembly, and subassemblies thereof, having desired electrical and mechanical qualities and being characterized in permitting relatively easy, speedy and economical manufacture using relatively few different parts.

As an example, a memory matrix including features according to the invention consists of a rectangular frame made of similar legs of insulating material. Each leg is provided with an enlarged end portion formed to receive the other end of an adjacent leg. The outside surfaces of the legs of a frame are provided with slots from which terminals extend. A mat of memory elements linked by coordinate wires is located inside the frame. The wire ends extend in grooves across the top surfaces of the legs, and are connected by wrapping and dip soldering to respective terminals. The described structure is known as a memory plane, and each memory plane may include two mats and two sets of terminals in the same one frame. The ends of the terminals extending from the outside surfaces of a memory plane are formed for dip solder connection with corresponding terminals on adjacent planes when a plurality of planes are stacked one upon another. When planes are stacked, the enlarged end portions of the legs at the corners of the frame act as spacers to provide a ventilation spacing between planes.

These and other objects and aspects of the invention will be apparent to those skilled in the art from the following more detailed description taken in conjunction with the appended drawings, in which:

FIGURE 1 is a plan view of a memory plane constructed according to the teachings of this invention;

FIGURE 2 is a perspective view of one of the four legs forming the frame of the memory plane of FIGURE 1;

FIGURE 3 is a plan view of a plurality of temporarily attached spring-lock terminals prior to assembly in the frame leg of FIGURE 2; and

FIGURE 4 is a fragmentary perspective view illustrating construction details, and illustrating the relationship between a plurality of memory planes like the one shown in FIGURE 1 when they are stacked one upon another.

FIGURE 1 shows a memory plane 10 including a frame constructed from four similar legs 5, 6, 7 and 8. The four legs are preferably molded from an insulating material such as allyl or alkyd resins with short glass fiber filler. The memory plane 10 also includes memory cores 11, which are threaded by coordinate wires 12 and 13 terminating at the ends 14 of terminals imbedded in the legs 5, 6, 7 and 8 of the frame.

FIGURE 2 shows the construction of each of the four similar legs 5, 6, 7 and 8 of the frame of the memory plane 10. The leg in FIGURE 2 includes a first end portion 18, an intermediate portion 20 and an enlarged end portion 22. The enlarged end portion 22 is provided with a socket 24 dimensioned to receive the first end portion 18 of another leg. The intermediate portion 20 is provided with a plurality of terminal-receiving rectangular slots 26 arranged in upper and lower rows, with each slot preferably extending from the inside surface 28 of

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the leg to the outside surface 30. However, it is not essential that the slots 26 open onto the inside surface 28. The inside surface 28 of the leg is provided with a longitudinal slot 32 for receiving the edge of a mounting board 48. The top surface 34 and the bottom surface 36 of the leg are provided with transverse wire-receiving grooves 38, there being a groove 38 associated with each of the terminal-receiving slots 26.

FIGURE 3 shows a plurality of spring-lock terminals which have been partially punched out from a piece of sheet metal 40 so that they are temporarily supported like the teeth of a comb. A coin line or partial cut 42 permits the terminals to be easily broken from the metal sheet 40. Each of the terminals includes a connection end 14, a narrowed wire-wrap receiving portion 46 and a spring-lock portion 47 adapted to lock the terminal in a slot 26 in the leg of FIGURE 2. The spring-lock ends 47 of the terminals of the comb structure of FIGURE 3 are forced into the slots 26 in the leg of FIGURE 2 from the outer side 30 of the leg. After the terminals are forced into position in the slots, the sheet metal 40 is bent at the coin line 42 to break the "back" of the comb from the teeth (terminals) imbedded in the slots 26. The individual terminals are then separate from each other and each is firmly imbedded in and extended from a respective slot 26. The connection end 14 of the terminals are then uniformly bent or formed in the manner illustrated in FIGURE 4 so that the terminals extending from the frame of one memory plane will contact the respective terminals extending from the frame of an adjacent, stacked memory plane.

When the four legs, all like the one of FIGURE 2, are in the process of being assembled together with the first end 18 of one secured in the socket 24 of another to form a rectangular frame, a mounting board or spacer board 48 is positioned inside the frame so that its edges are rabbeted in the longitudinal grooves 32 of the four legs. The mounting board 48 is preferably provided with perforations (not shown) for the purpose of facilitating ventilation through the completed memory stack.

A memory plane, as shown in FIGURE 1, includes a mat which consists of an orderly array of memory cores 11 which are linked by, or threaded by, column conductors or wires 12 and orthogonally related row conductors or wires 13. The mat is separately assembled with the coordinate wires 12 and 13 extending loosely out from around the periphery of the mat. The mat is then placed inside a frame on the mounting board 48 and each of the coordinate wires is laid across the top surface of a leg, in one of the transverse grooves 38. The end of each wire is then pulled tight and wrapped around the narrowed portion 46 of the wire connection end of the corresponding terminal. The excess wire is snapped off by manually jerking the free end of the wire. Another mat is placed in the frame on the other side of the mounting board 48 and similarly connected to corresponding terminals. When all of the coordinate wires are thus secured to the wire-connection ends of the terminals, the connections are electrically perfected by dip soldering.

Other wiring configurations may be employed if desired. For example, a coordinate wire 13 may extend from an upper terminal 14 on leg 8 through cores on the top side of the board 48, through a hole in the board 48 near the leg 6, through cores on the bottom side of the board 48 and thence to a bottom terminal on leg 8. The next adjacent wire 13 is reversed in that it extends from a top terminal on leg 6 to a bottom terminal on leg 6. A similar arrangement is employed for the coordinate wires 12. By this construction a four-to-one increase can be made in the number of cores that can be accommodated by the terminals on a given frame.

According to another wiring configuration, a single mat is used in the frame and the mounting board 48 is omitted. Alternate ones of the wires 13 are connected from the top terminal 14 on leg 8 through cores to the bottom terminal on leg 6, and intermediate ones of the wires 13 are connected from the bottom terminal on leg 8 through cores to the top terminal on leg 6. A similar arrangement is employed for the coordinate wires 12.

The cores 11 of the mat may also be threaded with additional wires (not shown), such as for the purpose of providing digit and sense windings. In this event, some terminals (near the corners of the frames) are reserved for the connection thereto of the additional wires. The cores 11 and the wires threaded therethrough may be sprayed with a heavy plastic coating to hold them in place and prevent them from vibrating.

When a plurality of memory planes as thus far described have been assembled, the memory planes are stacked one upon another and held together by means of bolts or the like through registered corner bolt holes 56. After the planes are bolted together to form a stack, the contacting ends 14 of the terminals on adjacent planes are dip soldered together.

It is thus apparent that according to this invention there is provided a novel memory matrix having many superior electrical and mechanical qualities and being relatively simple, speedy and economical to manufacture from relatively few different parts.

What is claimed is:

1. A memory plane frame comprising four similar elongated legs, each of said legs having an enlarged portion at one end thereof, said enlarged portion being provided with a socket dimensioned to receive the other end of another leg, said four legs being fitted together to form a rectangular frame, whereby said enlarged ends at the four corners of the frame provide ventilation spacing between planes when a plurality of planes are stacked one upon the other.

2. A memory plane comprising a plurality of similar legs made of insulating material and fitted together to form a rectangular frame, each of said legs having top, bottom and outside surfaces and having an enlarged end portion provided with a pocket to receive the other end of an adjacent leg, each of said legs being provided with terminals having connector ends extending from the outside surface thereof, and a mat within said frame, said mat including magnetic memory elements threaded with wires, said wires being laid across at least one of the top and bottom surfaces of said legs and being connected to the connector ends of respective ones of said terminals.

3. A memory plane comprising a plurality of similar legs made of insulating material and fitted together to form a rectangular frame, a mounting board within the frame and having edges rabbeted into said legs, each of said legs having top, bottom and outside surfaces and having an enlarged end portion provided with a socket to receive the other end of another leg, each of said legs being provided with wire-receiving grooves on top and bottom surfaces thereof and with two rows of terminal-receiving slots extending through between the inside and outside surfaces of the leg, spring-locking terminals mounted in said slots with connector ends extending from the outside surfaces of the legs, and two mats within said frame, one mat being on one side of said mounting board and the other mat being on the other side of the mounting board, each of said mats including magnetic memory elements threaded with coordinate wires, one end of each of said wires being laid in one of said grooves and connected by wrapping and dip soldering to the connector end of one of said terminals.

4. A core matrix assembly comprising a plurality of memory planes, each of said planes including a plurality of similar legs fitted together to form a rectangular frame, each of said legs having top, bottom and outside surfaces and having an enlarged end portion and a uniformly

dimensioned remaining portion, said enlarged end portion being provided with a socket to receive the end of a uniformly dimensioned portion of an adjacent leg, each of said legs being provided with terminals having connector ends extending from the outside surface of the leg, and a mat within said frame, said mat including magnetic memory elements threaded with wires, one end of each of said wires being each laid across the frame and connected to the connector end of one of said terminals, and means for maintaining a plurality of said memory planes in stacked relationship wherein the enlarged ends of the legs serve to space the planes for ventilation.

5. A core matrix assembly comprising a plurality of memory planes, each of said planes including a plurality of similar legs made of insulating material and fitted together to form a rectangular frame, each of said legs having top, bottom and outside surfaces and having an enlarged end portion provided with a socket to receive the other end of an adjacent leg, each of said legs being provided with terminals having connector ends extending from the outside surface of the leg, and a mat within said frame, said mat including magnetic memory elements threaded with coordinate wires, one end of each of said wires being laid across the frame and connected to the connector end of one of said terminals and means for maintaining a plurality of said memory planes in stacked relationship wherein the enlarged ends of the legs serve to space the planes for ventilation, the connector ends of terminals on one memory plane being formed to contact the connector ends of terminals on an adjacently stacked memory plane.

6. A core matrix assembly comprising a plurality of memory planes, each of said planes including a plurality of similar legs made of insulating material and fitted together to form a rectangular frame, each of said legs having top, bottom and outside surfaces and having an enlarged end portion provided with a socket to receive the other end of another leg, each enlarged end portion and each other end socketed therein being provided with registered bolt holes, each of said legs being further provided with terminals having connector ends extending from the outside surfaces of the legs, and a mat within said frame, said mat including magnetic memory elements threaded with coordinate wires, one end of each of said wires being connected to the connector end of one of said terminals, and means cooperating with said registered bolt holes for maintaining a plurality of said memory planes in stacked relationship wherein the enlarged ends of the legs serve to space the planes for ventilation, the connector ends of terminals on one memory plane being formed to contact the connector ends of terminals on an adjacently stacked memory plane.

7. A core matrix assembly comprising a plurality of memory planes, each of said planes including a plurality of similar legs made of insulating material and fitted together to form a rectangular frame, each of said legs having top, bottom and outside surfaces and having an enlarged end portion provided with a socket to receive the other end of another leg, each of said legs being further provided with wire-receiving grooves on at least one of the top and bottom surfaces thereof and with terminals having connector ends extending from the outside surfaces of the legs, and a mat within said frame, said mat including magnetic memory elements threaded with coordinate wires, at least one end of each of said wires being laid in one of said grooves and being connected to the connector end of one of said terminals, and means for maintaining a plurality of said memory planes in stacked relationship wherein the enlarged ends of the legs serve to space the planes for ventilation, the connector ends of terminals on one memory plane being formed to contact the connector ends of terminals on an adjacently stacked memory plane.

8. A core matrix assembly comprising a plurality of memory planes, each of said planes including a plurality of similar legs made of insulating material and fitted together to form a rectangular frame, a perforated mount-

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ing board within the frame and having edges rabbeted into said legs, each of said legs having top, bottom and outside surfaces and having an enlarged end portion provided with a socket to receive the other end of another leg, each of said legs being provided with two rows of terminal-receiving slots extending through between the inside and outside surfaces of the leg, spring-locking terminals mounted in said slots with connector ends extending from the outside surfaces of the legs, and two mats within said frame, one mat being on one side of said mounting board and the other mat being on the other side of the mounting board, each of said mats including magnetic memory elements threaded with coordinate wires, at least one end of each of said wires being laid across the frame and connected by wrapping and dip soldering to the connector end of one of said terminals, and means for maintaining a plurality of said memory planes in stacked relationship wherein the enlarged ends of the legs serve to space the planes for ventilation, the connector ends of terminals on one memory plane being

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formed to contact the connector ends of terminals on an adjacently stacked memory plane, said contacting ends being dip soldered together.

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