

April 12, 1960

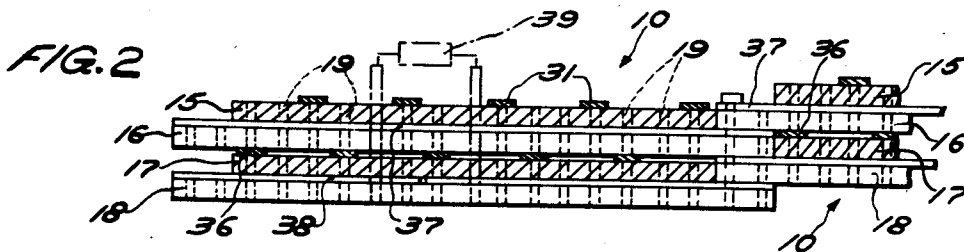
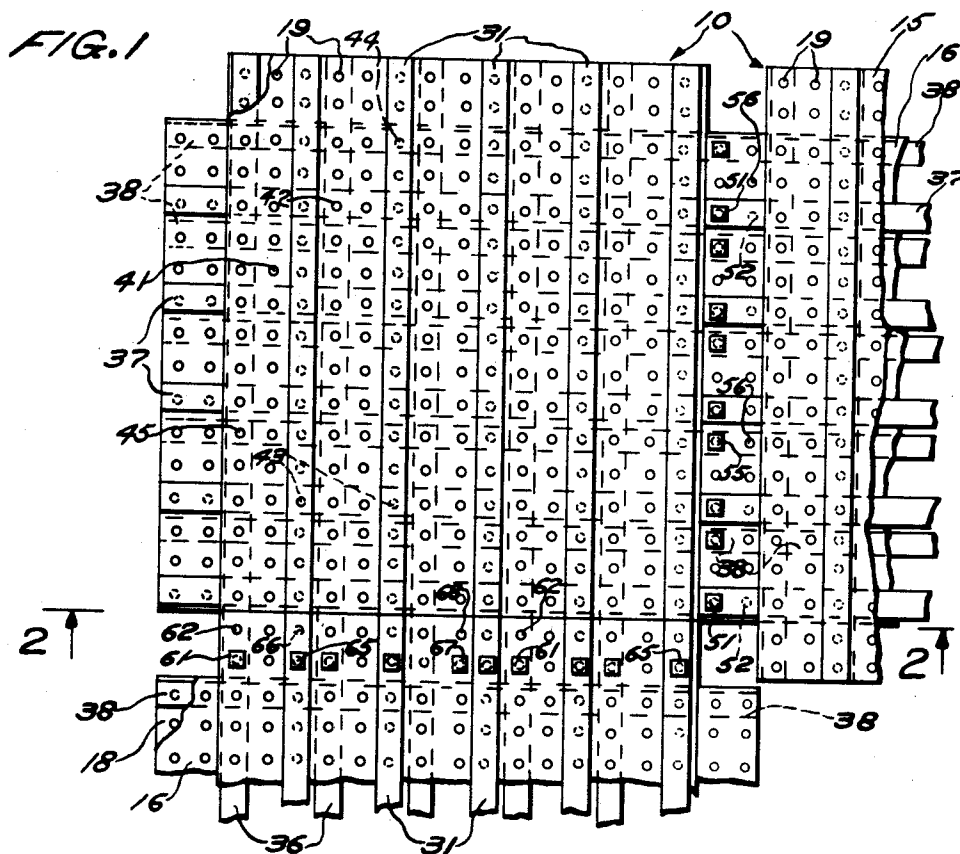
P. H. BOWMAN ET AL

2,932,772

CIRCUITRY SYSTEMS AND METHODS OF MAKING THE SAME

Filed June 11, 1956

2 Sheets-Sheet 1



INVENTORS
P. H. BOWMAN
H. A. DVORAK
BY C. H. Hamilton
ATTORNEY

April 12, 1960

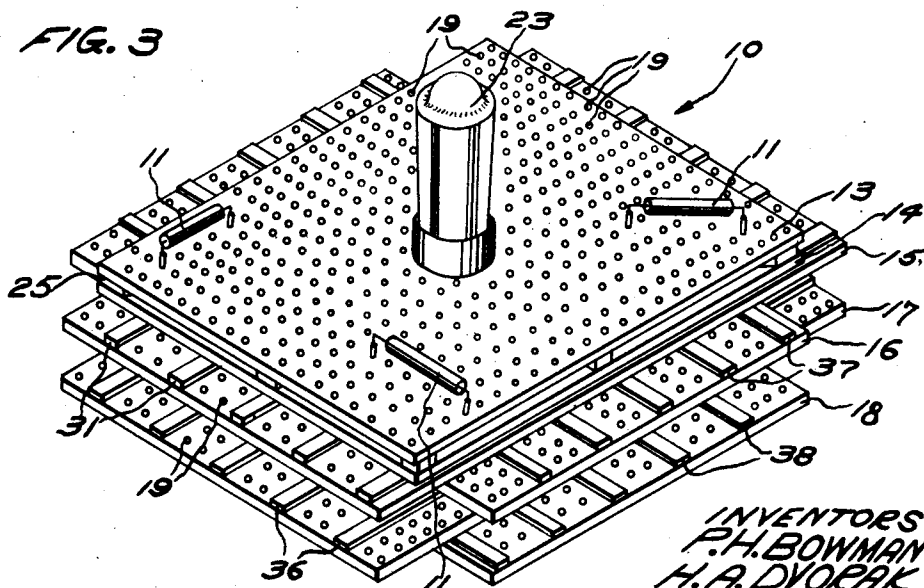
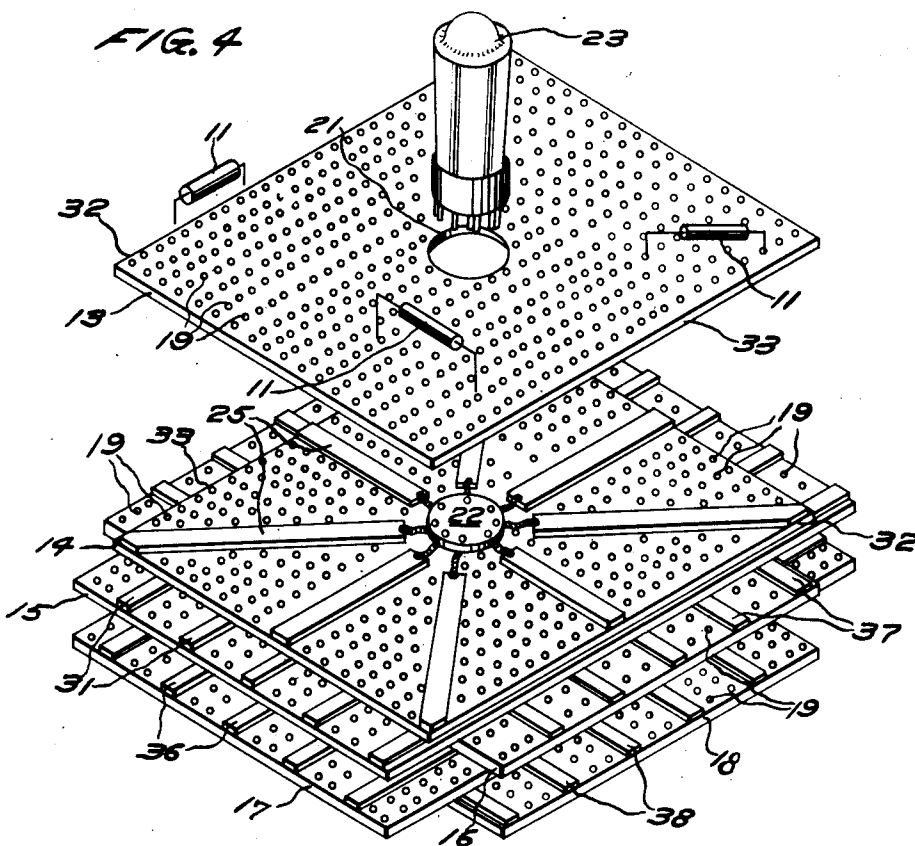
P. H. BOWMAN ET AL

2,932,772

CIRCUITRY SYSTEMS AND METHODS OF MAKING THE SAME

Filed June 11, 1956

2 Sheets-Sheet 2



INVENTORS
P. H. BOWMAN
H. A. DVORAK
BY C. B. Hamilton
ATTORNEY

1

2,932,772

CIRCUITRY SYSTEMS AND METHODS OF MAKING THE SAME

Paul H. Bowman, La Grange Park, and Howard A. Dvorak, Brookfield, Ill., assignors to Western Electric Company, Incorporated, New York, N.Y., a corporation of New York

Application June 11, 1956, Serial No. 590,673

5 Claims. (Cl. 317-101)

This invention relates to circuitry systems, and has for an object thereof the provision of universal wiring systems for interconnecting electrical components.

Another object of the invention is to provide composite component mounting boards or cards having universally connectible points thereon.

Another object of the invention is to provide circuitry mounting boards having pins driven through insulating sheets or cards to connect conductive strips some of which are disposed in parallel positions in between two sheets or cards, and others are disposed in positions extending transversely of the first conductive strips and located between other sheets, and pins connecting the strips of the different layers at intersecting points thereof.

A further object of the invention is to provide wiring systems having conductive strips extending along coordinate rows of perforations of interleaving insulating sheets or cards at angles to one another in the different layers between these sheets, and a plurality of pins driven through the perforations in the sheets or cards at points of intersections of the strips and methods of making such wiring systems.

A wiring system illustrating certain features of the invention may include a plurality of insulating sheets or cards having coordinate rows of perforations aligned with one another, conductive strips extending parallelly between two insulating sheets or cards along rows of perforations and conductive strips positioned between another pair of sheets or cards along rows of perforations extending angularly relative to the first-mentioned conductive strips. Pins driven through perforations at the intersections of the rows connect the intersecting strips electrically together and lock the sheets or cards of insulating material together.

A complete understanding of the invention may be obtained from the following detailed description of a wiring system forming specific embodiments thereof when read in conjunction with the appended drawings, in which

Fig. 1 is a top plan view of a wiring system for connecting a plurality of mounting boards into one system forming one embodiment of the invention;

Fig. 2 is a sectional view taken along line 2-2 of Fig. 1;

Fig. 3 is a perspective view of a wiring system made in accordance with another embodiment of the invention, and

Fig. 4 is an exploded, perspective view of the system shown in Fig. 3.

Referring now in detail to the drawings, there is shown a wiring system or wired mounting board mounting electrical components 11 and interconnecting the components 11 as desired. The composite board 10 includes insulating sheets or cards 13, 14, 15, 16, 17 and 18 (Figs. 3 and 4) having coordinate rows of perforations 19 therein and stacked so that predetermined perforations in one of the sheets are aligned with predetermined perforations in the other sheets. The sheets 13 and 14 have a hole

2

21 and a socket 22 which are aligned for mounting a tube 23 therein, and conductive strips 25 are positioned between the sheets 13 and 14 along radially disposed rows of perforations relative to the hole 21 and socket 22, the strips 25 may be composed of copper or brass, or the like, and may be coated with solder if desired, or may be bare. The strips 25 also may be secured to one of the sheets 13 and 14 by a suitable adhesive or bonding means.

Conductive strips 31 are positioned between the insulating sheets 14 and 15 and extend along rows of perforations 19 parallel to edges 32 and 33 of sheets 13 and 14. The strips 31 are secured by adhesives or like over the certain desired rows of the perforations 19 in the insulating sheet or card 15. In the present instance, the lefthand strip 31 (Figs. 3 and 4) is secured over the third row of holes 19 of the sheet or card 15, the next strip 31 is secured to the sixth row of perforations 19 from the lefthand edge of the card 15 and the other strips likewise secured to every third row of perforations, the last strip being secured over the fifteenth row of perforations 19, there being fifteen rows of perforations extending parallel to the strips 31. Each of the cards 16, 17 and 18 is identical with the card 15 but the strips on card 17 are arranged differently with respect to the strips on card 15 so that strips 36 on the card 17 are not positioned directly below the strips 31 but are offset laterally from the strips 31 one row of perforations on the lefthand side, and are in the next row of perforations for those of the strips 31 on the lefthand side of the strips 36. Similarly, the cards 16 and 18 are turned 180° relative to one another in the plane of the cards so that strips 37 and the row of perforations 19 along which they extend are positioned one row of perforations to the left of strips 38 on the card 16, and there is one row of perforations between the righthand edges of the strips 38 and the lefthand edges of the next strips 37. One of the strips 33 may be discontinuous and be connected by a resistor 39 (Fig. 2) or other component.

Thus, as viewed in Fig. 1, if a pin is driven through perforations 41 it does not strike any of the conductive strips and may serve as a mechanical interlock between the cards 15 through 18 and as an insulated mounting post for one of the electrical components. Similarly, a pin driven through the perforations 42 will connect the strips 36 and 37. A pin driven through the perforations 43 will connect one of the strips 31 and one of the strips 37. A pin driven through the perforations 44 will connect the strip 31 to one of the strips 38. A pin driven through the perforation 45 will connect at least one of the strips 38 to the strip 36.

The composite boards 10 may be interconnected together by inserting the projecting portions of the cards 16 and 18 between the corresponding ends of the cards 15 and 18 of another board 10 so that the conductive strips 38 of each of the cards 18 are superimposed, and the conductive strips 37 of each of the boards 16 are superimposed. Then pins 51 may be driven through aligned perforations 52 in the overlapping end portions of the cards to connect the strips 37 electrically together and interlock the boards, and pins 55 may be driven through perforations 56 in the overlapping ends of the cards to connect the strips 38 together electrically. Similarly, a third card 10 having projecting end portions of the cards 15 and 17 may be interleaved with the projecting end portions of the cards 15 and 17 of the first card 10 with the strips 31 of one board superimposed over the strips 31 of the other board, and the strips 36 of one of the boards superimposed over the strips 36 of the other board. Pins 61 may be driven through perforations 62 to form electrical connections between the strips 36 and on the boards 17 and the strips 36 on the other board. Pins 65 may be driven through perforations 66 to connect

the two boards together mechanically. Thus, continuity between the conductive strips 31 of each of the boards may be made as well as possible for mounting as many components as desired on the strips, for example, power leads or bus bars may be connected to all the strips 31. Similarly, the strips 36 may be made as long as possible and extended as far as desired. Also, the strips 37 and 38 of the boards are locked together securely and may be easily handled and manipulated for manufacturing purposes. The pins 57 may be driven through perforations 68 and serve as a mechanical interlock as do pins driven through perforations 41. To connect the pins to the conductive strips which are coated with rosin-flux, the pins are coated with solder and as they perforate the strips, they push down the edges of the perforations into the holes in the perforated board into which the pins are entering so that a good pressure point is connected therebetween. Then if the pins are heated as by passing an electrical current therethrough sufficient to heat the pins and melt the solder, the solder melts and then is permitted to cool to solder the pins to the strips that they have been driven to.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A universal wiring system, which comprises a stack of sheets of insulating material each having perforations arranged in a plurality of coordinate rows and aligned with the perforations in the other sheets, a first group of conductive strips extending parallelly in one direction between one pair of the sheets along first parallel rows of perforations, a second group of conductive strips extending between another pair of the sheets along second parallel rows of perforations crossing said first parallel rows of perforations, a third group of conductive strips extending parallelly to the first group of strips along rows of perforations offset from the first rows of perforations, a fourth group of conductive strips positioned between another pair of the sheets and extending diagonally relative to the other conductive strips and crossing the other conductive strips at perforations in the sheets, and a plurality of electrical components having leads driven through the perforations and the strips where predetermined strips cross and soldered to the strips.

2. A universal wiring system comprising a plurality of pileups including insulating sheets and conductive strips, alternate ones of the insulating sheets of each pileup having portions extending beyond the other sheets of that pileup and interleaving with and interlocked with similar portions of another pileup, and means connecting the strips of the interlocked pileups electrically.

3. A universal wiring system comprising a plurality of pileups, each pileup including a plurality of insulating sheets having conductive strips on one face thereof, the strips on each sheet extending parallel to the other strips on that sheet, alternate sheets on each pileup projecting beyond the edges of the other sheets of that pileup and the portions of the conductive strips on the projecting por-

tions extending therealong generally in the direction that the portions project, the projecting portions of one side of the sheets of one pileup being interleaved with projecting portions of one side of the sheets of another pileup, and pins driven through the interleaved portions of the sheets of the two pileups to lock them together and also driven through the conductive strips to connect them electrically together.

4. A universal wiring system comprising a stack of several sheets of insulator material having aligned spaced perforations forming parallel rows and extending parallelly, perpendicularly and diagonally relative to one edge of the sheets, metallic conductive strips extending along certain of said rows of perforations between the sheets of insulator material, a first group of conductive strips extending diagonally to one edge of the sheets and between a pair of sheets, a second group of conductive strips between another pair of sheets extending perpendicularly to said first group, a third group of conductive strips extending diagonally to the first two groups of strips and between a third pair of sheets, other groups of conductive strips between pairs of insulator sheets oriented in the same direction as one of the aforementioned groups and offset at least one row of perforations from said group such that no one strip overlays another, and elongated connectors extending through the perforations and strips where certain of the strips cross to connect any one strip to any other strip to produce a desired circuitry.

5. A universal wiring system comprising a plurality of stacks of insulator sheets having parallel rows of perforations throughout the sheets extending parallelly, perpendicularly and diagonally relative to one edge of each sheet, said perforations in each sheet aligned with corresponding perforations in the other sheets, conductive strips positioned parallelly between the sheets extending along one of the directions defined by and covering rows of perforations in the sheets, the strips between different sheets and extending in the same direction being offset a row of perforations from one another such that no one strip overlays another, alternate sheets in the stack having portions extending beyond the other sheets for interleaving and interlocking with sheets of another stack, and conductive pins inserted in certain of the perforation for connecting the strips of various stacks together and connecting any strip to any other strip to form a desired circuit.

References Cited in the file of this patent

UNITED STATES PATENTS

2,268,619	Reid	Jan. 6, 1942
2,492,235	Mitchell	Dec. 27, 1949
2,502,291	Taylor	Mar. 28, 1950

FOREIGN PATENTS

223,402	Great Britain	Oct. 23, 1924
---------	---------------	---------------

OTHER REFERENCES

Stamped Wiring, 4 pages, a reprint from Electronics, June 1947; copyrighted (all rights reserved), by McGraw-Hill Pub. Co.