

[54] **BUS STRIP**

[75] Inventors: **Michael F. Iosue**, Tempe, Ariz.;
Robert E. Sanders, Old Saybrook,
Conn.

[73] Assignee: **Rogers Corporation**, Rogers, Conn.

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[51] Int. Cl. **H01r 31/08**

[58] Field of Search **339/19, 22 B, 242, 256,**
339/258, 273, 277; 248/60; 211/89, 69.8;
24/81 H, 81 PC, 243 Q

[56] **References Cited**

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Primary Examiner—Bobby R. Gay

Assistant Examiner—Robert A. Hafer

[57] **ABSTRACT**

A bus strip which can be mounted on an array of terminal posts merely by pushing the bus strip into mounting engagement with a desired plurality of terminal posts is disclosed. The bus strip is a one piece configuration having a central spine with a pair of wings radiating in opposite directions from one end of the spine. The spine is provided with a series of holes adjacent the junction of the spine and wings to mount the bus strip on an array of terminal posts, and the wings are contoured so as to spring load the strip against the terminal posts with three points of contact. The bus strip may also be provided with gaps in the wings and spine whereby contact with posts may be skipped as desired.

10 Claims, 5 Drawing Figures

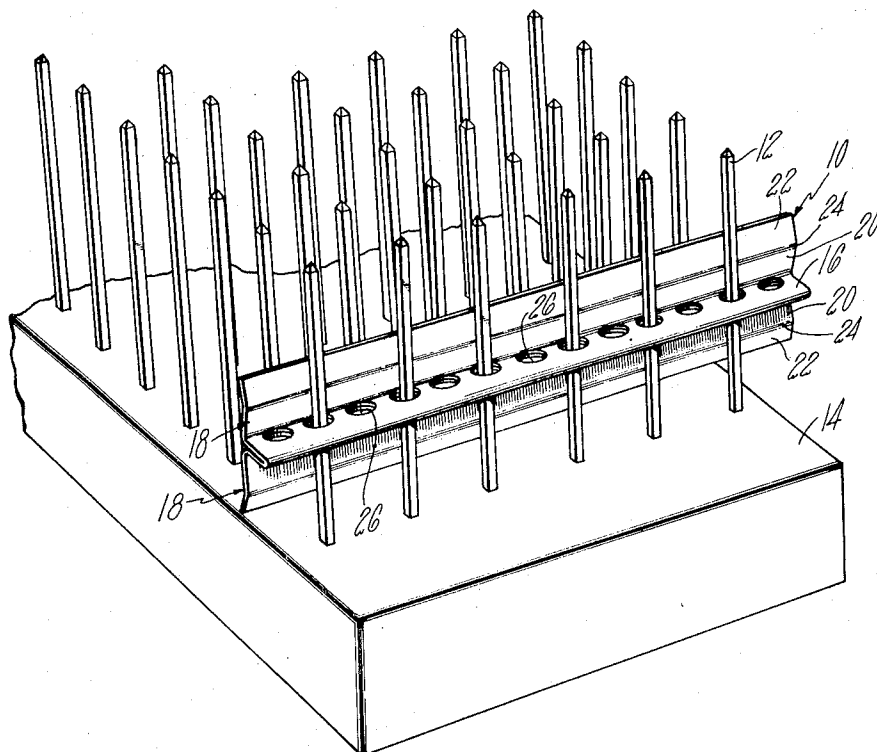


FIG. 1

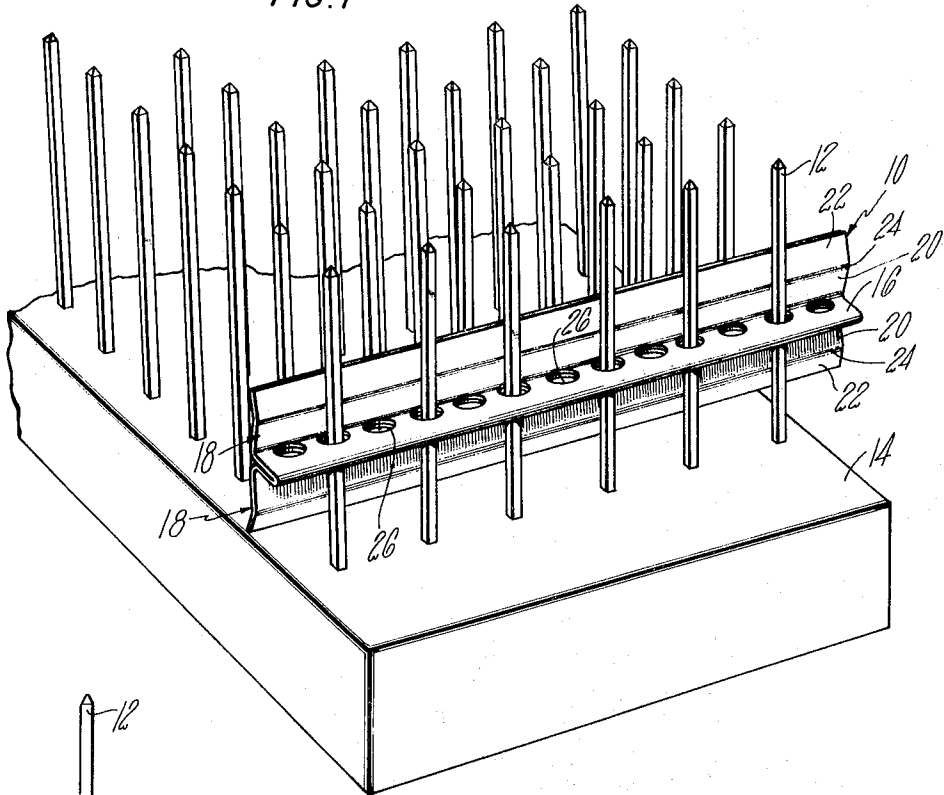


FIG. 2

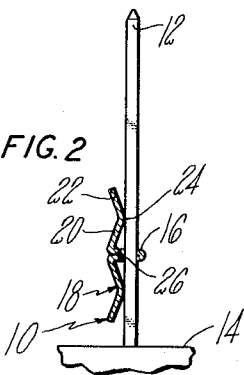


FIG. 3

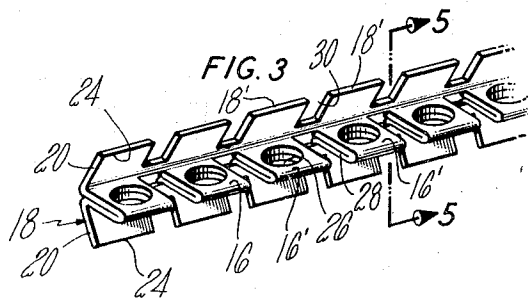


FIG. 4

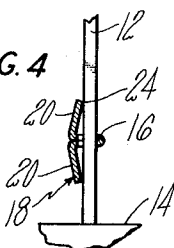
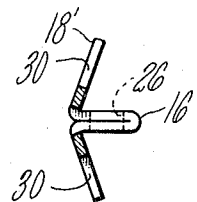


FIG. 5



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BUS STRIP

BACKGROUND OF THE INVENTION

This invention relates to electrical bus strips. More particularly, this invention relates to electrical bus strips for interconnecting an array of terminal pins or terminal posts on devices such as terminal blocks and circuit boards.

In many environments, especially but not limited to the computer industry, large numbers of electrical circuits are connected to circuit boards or terminal blocks having terminal posts leading to the various circuits. Interconnection between the terminal posts and various circuits is accomplished in a variety of fashions such as, for example, by wire wrap connecting. It is often desired or required to interconnect; i.e., bus together; a plurality of terminal pins to provide, e.g., a common power supply, common grounding, or circuit interconnections. Typical prior art approaches to the bussing problem have included the techniques of soldering a single conductor to each of a desired series of terminal posts and wire wrapping a common wire to a series of terminal posts. However, such prior art bussing approaches are time consuming and thus relatively costly production operations since a great deal of manual labor is required. Also, soldering and wire wrapping techniques inherently present the risk of achieving one or more poor electrical connections. Suggestions have also been made in the art to provide fabricated connector buses. Examples of such fabricated buses in the prior art can be found in the U.S. Pats. to Hovnanian No. 3,609,634, Walterscheid, No. 3,356,183, Sullivan, No. 3,488,620, Sullivan, No. 3,582,864 and IBM Technical Bulletin Vol. 14, No. 8 January 1972. However, these prior fabricated bus devices have been of somewhat limited versatility, and some of them are not easily adaptable to bussing patterns of posts, especially irregular patterns, as distinguished from bussing all of the posts in an array. Additionally many of these fabricated bus connectors have the serious drawback of requiring insulating pads at the location of terminal posts which are to be skipped.

SUMMARY OF THE INVENTION

The bus strip of the present invention is a one-piece device which can be mounted on an array of terminal pins merely by aligning openings in the bus with the desired terminal pins and then pushing the bus down on the terminal pins. The bus strip has a central spine with a pair of wings radiating from opposite sides of one end of the spine. A series of holes is provided in the spine, preferably near the juncture of the spine and the radiating wings, and these holes are positioned for mating engagement with contact pins or terminal posts. The spine and the wings can be provided with open spaces, but while still maintaining the mechanical structural integrity of the bus strip, so that connections can be skipped between alternate pins or between pins in any desired regular or irregular pattern, while still permitting use of just the one-piece bus strip.

BRIEF DESCRIPTION OF THE DRAWING

Referring to the drawings, wherein like elements are numbered alike in the several figures:

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FIG. 1 is a perspective view of a bus strip in accordance with the present invention mounted on a series of terminal posts on a terminal block.

FIG. 2 is an end view of the mounted bus strip of FIG. 1, viewed looking at the left end of FIG. 1.

FIG. 3 is a perspective view of a modified configuration of the bus strip of the present invention with spaces being provided to skip connection with various terminal pins.

FIG. 4 is a view, similar to the view of FIG. 2, of the bus strip of FIG. 3.

FIG. 5 is a view taken along line 5—5 of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1 and 2, the bus strip 10 of the present invention is shown mounted on a row of terminal pins 12 of a terminal block or circuit board 14. It will be understood that the terminal block 14 and the terminal pins 12 do not form part of the invention but are shown for purposes of illustrating the environment in which the invention may be employed.

The bus strip, which is made from any suitable conducting material such as copper, has a central spine 16 of general U-shaped configuration in cross-section with a pair of wings 18—18 radiating from opposite sides of the open end of the U-shaped spine. The wings 18 are crimped or bent so that the portion 20 immediately adjacent the spine is inclined toward the spine, so as to form an included acute angle with the plane of the spine, and the other portion 22 of the wing is inclined in the opposite direction. The junction or line of bend between the two angled portions of each wing forms contact areas or surfaces 24 for establishing electrical and mechanical contact between the bus strip and the terminal posts 12. A series of openings 26 are formed in spine 16, preferably adjacent to the junction between the wings and the spine, and these openings are positioned to engage the terminal pins 12.

Mounting of the bus strip of the present invention is a particularly simple and efficient operation. Openings 26 are aligned with the tops of the pins 12 on which the bus is to be mounted, and the bus is then pushed down on the pins to any desired position at or above the terminal block. The bus strip is proportioned so that the contact areas or surfaces 24 are aligned with or overlap part of the openings 26. That is, wing portion 20 is inclined toward spine 16 to such a degree and amount that a line tangent to the surface 24 on each of wings 18 and perpendicular to a plane bisecting spine 16 will pass through opening 26. This proportioning between the spine and the wings results in a spring loading action urging the contact surface 24 on each wing into contact with one surface of the terminal pin while simultaneously urging the surface of opening 26 closest to the closed edge of the spine into contact with the opposed surface of the terminal pin. Thus, this proportioning results in a spring loaded mounting of the bus strip on the terminal pins and provides three discrete contact areas between the bus strip and each pin being contacted.

FIG. 1 shows a configuration wherein the number of holes 26 is double the number of pins in any one row. This illustrates the versatility of the bus strip in that it can be used for pin patterns of different spacings. Furthermore, bus strips can easily be fabricated for irregu-

lar pin patterns merely by changing the spacing between openings 26.

Referring now to FIG. 3, a modified version of the bus strip is shown wherein the wings 18 include only the first inclined portion 20. The contact areas 24 of the FIG. 3 embodiment are defined by the ends of the wing portions 20 which bear against the terminal pin as shown in FIG. 4. A comparison between FIGS. 2 and 4 shows that the arrangement of FIG. 2 has larger contact areas 24 resulting from the bend or junction line between the wing sections. The contact areas of the embodiment of FIGS. 3 and 4 can be increased by contouring the contact areas 24 to a round configuration or a flat surface parallel to the contact pins. The configuration of the device shown in FIGS. 3 and 4 is proportioned as is the FIG. 2 embodiment so that the contact areas 24 on the opposed wings overlap the opening 26 so as to urge the surfaces of openings 26 adjacent the closed end of the spine into contact with associated terminal pins thus forming a three point contact with the terminal pins.

The FIG. 3 embodiment, and particularly as shown in FIG. 5, possesses an additional feature of the invention which permits the bus strip to be fabricated to suit bus- 25
ing requirements wherein one or more pins in a row are to be skipped. As illustrated in FIGS. 3 and 5, the spine and wings may be formed in a toothed or serrated configuration with spaces 28 and 30 separating spine segments 16'—16' and wing segments 18'—18', re- 30
spectively. These spaces are formed by parts of the spine and wings at desired places so as to form the spaced apart sections of the spine and wings while still retaining a unitary and integral bus strip. The configuration of FIGS. 3—5 is particularly versatile in that it 35
permits the use of the bus strip for interconnecting any desired irregular pattern of terminal pins in a row by leaving open spaces, i.e., the spaces 28 and 30, at the location of the pins to be skipped. Furthermore, it will 40
be noted that the location and sizing of the spacings at the pins to be skipped is such that a complete absence of contact between the bus strip and the pins to be skipped is assured, the openings being larger than the 45
pin to be skipped, thus eliminating the need for the use of insulating pads or any other kind of insulation on the bus strip at the location of the pins to be skipped.

As will be apparent, the feature discussed with respect to the embodiment of FIGS. 3—5 whereby spaces 50
are provided in the spine and wings to skip pin contact can also be effected with the embodiment of FIGS. 1 and 2 by providing the desired spacings in the spine and in both of the wing portions 20 and 22. As will also be apparent, the spine can be shaped in a V or otherwise. Alternatively, the bus strip can be fabricated, such as 55
by extrusion, so that the spine 16 is in one flat piece.

While preferred embodiments have been shown and described, various modifications and substitutions may be made thereto without departing from the spirit and 60
scope of the invention. Accordingly, it is to be understood that the present invention has been described by way of illustration and not limitation.

What is claimed is:

1. A bus strip for mounting on an array of terminal pins for electrically interconnecting pins in the array, the strip including:

a spine section having a plurality of spaced apart openings therein for mounting on an array of terminal pins;

a pair of wings extending in opposite directions from one end of said spine section, at least a part of each of said wings overlapping part of said spine; and contact surface areas on said wings aligned with said openings in said spine whereby the bus strip is spring loaded into engagement at three spaced apart points along the length of terminal pins at said contact surfaces and the periphery of said spaced openings when mounted on an array of terminal pins.

2. A bus strip as in claim 1 wherein:

each of said wings includes a first section inclined in a direction from said one end of the spine toward the other end thereof and a second section extending in the opposite direction from said first section.

3. The bus strip as in claim 2 wherein:

the junction of said first and second wing sections defines said contact surface areas.

4. A bus strip as in claim 2 wherein:

said first wing section is inclined with respect to said spine to form an acute included angle therebetween.

5. A bus strip as in claim 1 wherein:

said spine section is composed of a plurality of spaced apart segments; and

said wings are composed of a plurality of spaced apart segments aligned with said spaced apart segments of said spine section, the spacings between segments in each of said wings being approximately equal to the spacing between corresponding aligned segments of said spine section.

6. A bus strip including:

a spine section of generally U-shaped configuration having a closed first end with legs extending to a second end, each of said legs having a plurality of spaced apart openings therein aligned with corresponding openings in the other of said legs;

a pair of wings extending in opposite direction from said legs at said second end, at least a part of each of said wings overlapping part of said spine; and contact surface areas on said wings aligned with said openings in said legs of said spine so that a line tangent to a contact surface area and perpendicular to a plane bisecting said spine will pass through said aligned openings, whereby the bus strip is spring loaded into engagement at three spaced apart points along the length of terminal pins at said contact surfaces and the periphery of said spaced openings when mounted on an array of terminal pins.

7. A bus strip as in claim 6 wherein:

each of said wings includes a first section inclined in a direction from said one end of the spine toward the other end thereof and a second section extending in the opposite direction from said first section.

8. The bus strip as in claim 7 wherein:

the junction of said first and second wing sections defines said contact surface areas.

9. A bus strip as in claim 7 wherein:

said first wing section is inclined with respect to said spine to form an acute included angle with a plane bisecting said spine.

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10. A bus strip as in claim 6 wherein:
said spine section is composed of a plurality of
spaced apart segments; and
said wings are composed of a plurality of spaced
apart segments aligned with said spaced apart seg- 5

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ments of said spine section, the spacings between
segments in each of said wings being approximately
equal to the spacings between corresponding
aligned segments of said spine section.
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