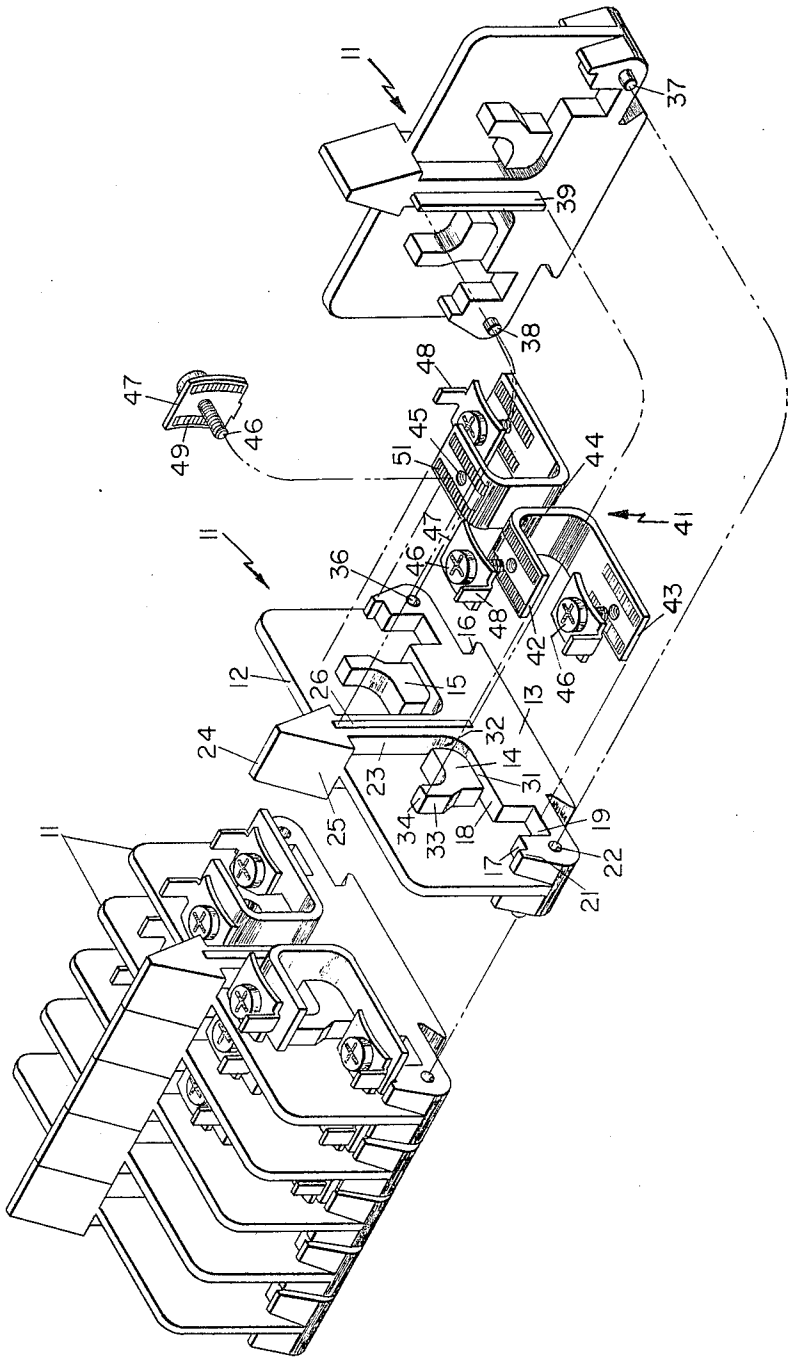
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TERMINAL BLOCK

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TERMINAL BLOCK

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ABSTRACT OF THE DISCLOSURE

A terminal block including a plurality of like insulating sections with a pair of generally J-shaped bus bars retained between each two adjacent sections.

FIELD OF THE INVENTION

This invention relates generally to electric terminal blocks and particularly to a compact sectional terminal block to which connections can be made quickly and easily.

BACKGROUND OF THE INVENTION

Electric terminal blocks are used, generally speaking, to interconnect electric conductors and are frequently used to interconnect two or more electric components which have been separately assembled and wired. Terminal blocks for these and other purposes have been used for many years and are available in many different shapes and sizes. Nevertheless, when the present inventors needed a terminal block for a particular application, they were unable to obtain a satisfactory model from commercial sources and therefore set about developing one which would be satisfactory. In the course of this development the present invention was made.

It is a general object of the present invention to provide an improved terminal block.

Another object is to provide a sectional terminal block which can be assembled easily in various sizes as required.

Another object is to provide a terminal block in which the electric connections thereto can be made quickly and easily.

Another object is to provide a terminal block which conserves lengthwise space.

Another object is to provide a terminal block in which the possibility for inadvertent loosening of the connections is minimized.

Another object is to provide a terminal block with provision for readily attaching and releasing temporary test leads.

Another object is to provied a terminal block to which a marker strip may be applied readily.

Another object is to provide a terminal block to which conductors without lugs or eyelets can be readily fastened.

SUMMARY OF THE INVENTION

One specific example of a terminal block incorporating the invention is a sectional block which can be assembled quickly to any reasonable length desired from a stock of a few basic parts. The principal parts are first, a generally flat insulating section formed with various protuberances and recesses on each side and second, a bus bar assembly comprising a flat, generally J-shaped conductive strip with a machine screw threaded into each leg of the J near its end. Each screw is provided with a slightly arched, captive, resilient, metal washer formed with a small upstanding lug and with corrugations on its under side. Two such bus bar assemblies are positioned between each two adjacent insulating sections where they are retained by the aforesaid protuberances and recesses. The bottom of each insulating section is formed into a dovetail so that the sections, as assembled, can be slipped between the flanges of a standard mounting base to which they may be clamped.

BRIEF DESCRIPTION OF THE DRAWING

For a clearer understanding of the invention, reference may be made to the following detailed description and its accompanying drawing, the single figure of which is an exploded view of a terminal block incorporating the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing, there are shown a plurality of identical upstanding insulating sections **11** which may, for example, be made of a phenolic resin. Each section has a thin central portion **12**, on the first face of which are formed three laterally extending protuberances **13**, **14** and **15**. The latter two are located symmetrically on either side of the vertical centerline of the portion **12** and are mirror images of each other while the former is symmetrical about the vertical centerline. The protuberance **13** is formed at the bottom with a flaring tenon or dovetail **16** which is intended to cooperate with a mating base (not shown).

Above the dovetail **16**, the protuberance **13** is formed on each side to define two coplanar horizontal ledges **17** and **18** separated by a recess **19**. Bounding the outside of the ledge **17** is an upstanding shoulder **21**. Just below the edge **17** and the shoulder **21**, the protuberance **13** has a cylindrical aperture **22** formed therein. A centrally located stem **23** extends upward, terminating in a generally triangular cap **24** having a sloping surface **25** on each side. The stem **23** has an elongated vertical recess or slot **26** formed therein.

The protuberance **14** is located just above the ledge **18** and includes a lower horizontal surface spaced therefrom and which defines, with the ledge **18**, a generally horizontal slot or recess **31**. The protuberance **14** also includes a generally vertical surface spaced from the stem **23** which defines therewith a vertical slot or recess **32**. Extending upward and toward the outside from the main portion of the protuberance **14** is a stem portion **33** terminating in a small horizontal ledge **34**.

As previously mentioned, the protuberance **15** is a mirror image of the protuberance **14** and therefore need not be further described.

The second face of the section **11** is similar, in fact almost identical, to that just described. The protuberances **13**, **14** and **15**, in effect, extend through the central portion **12** to the other side to a position directly opposite and are identical except that instead of the cylindrical recess **22** and its mirror image recess **36**, the second side has formed thereon complementary cylindrical extending portions or pins **37** and **38** and instead of the elongated recess or slot **26** there is a complementary extending portion or vane **39**.

A plurality of identical bus bar assemblies are indicated generally by the reference character **41**. Each comprises a flat strip of conductive material such as brass formed in the general shape of the letter J so as to have a short leg **42** and a long leg **43** substantially parallel to each other and joined by a connecting portion **44**. Each of the legs **42** and **43** is formed with a threaded aperture **45** to receive a machine screw **46**. Each screw **46** is provided with a captive washer **47** free to rotate on the shank but retained longitudinally to a position adjacent the head. The washer **47** is made of a resilient, conductive material such as spring steel and is generally, but not quite, rectangular, being slightly arcuate, or bowed, as shown. Each washer **47** is formed with a small upstanding lug **48** at one end to which a test lead may be clipped. The bottom

of each washer is formed with a row of corrugations **49** on each side of the screw **46**. The top of each of the legs **42** and **43** is formed with similar rows of corrugations **51** on each side of its threaded aperture.

To assemble a terminal block, a bus bar assembly **41** is placed, for example, on the left side of the first face of an insulating section **11** with the connecting portion **44** in the recess **32** adjacent the stem **23**, the leg **42** resting on the ledge **34** and the leg **43** resting on the ledges **17** and **18** adjacent to the shoulder **21**. A second bus bar assembly **41** may now be similarly placed on the right side of the same face of the same section **11** with the two connecting portions **44** back to back and spaced apart by the central stem **23**. When so placed the two short legs **42** are substantially coplanar and extend away from each other, in opposite directions from each other and from the stem **23**. Similarly, the two long legs **43** are substantially coplanar and extend in opposite directions.

It is to be noted that the shank of the screw **46** of the long leg **43** extends into the recess **19** while the shank of the screw **46** of the short leg **42** extends into the space between the stem **33** of the protuberance **14** and the stem **23** of the protuberance **13**. It is also to be noted that the ledges **17**, **18** and **34** are approximately one half, or slightly less, of the width of the legs **42** and **43**.

Next a second insulating section **11** is placed with its second face toward the first face of the above section. As the two sections are brought together, a pair of cavities are formed therebetween, the respective protuberances **13**, **14** and **15** abut each other, the corresponding recesses **19**, **31** and **32** are opposite each other, the pairs of ledges **17**, **18** and **34** jointly support the bus bar assemblies **41**, the extending portions or pins **37** and **38** enter the cylindrical recesses **22** and **36**, and the vane **39** enters the elongated recess **26**. Thus the two bus bar assemblies are held securely by the two insulating sections.

As many additional terminals as desired can be provided by using one additional insulating section for each additional pair of bus bar assemblies. It is contemplated that the dovetail of each section will be slipped under the flanges of a suitable base as the assembly proceeds and that the completed unit will be held by suitable clamps. The base and the clamps have not been illustrated since they are well known and form no part of the present invention.

Conductors may be attached very easily. No lugs or eyelets are required. The installer strips the insulation from the end of the wire and, while holding it with one hand, uses a screw driver with the other to loosen the screw **46** on the long leg **43**. As the screw is loosened, the captive washer **47** is prevented from rotating by its engagement with the central portion **12** of each section **11**. The washer rises, forming a space between the leg **43** and the washer **47** into which the end of the conductor is inserted, whereupon the screw **46** is tightened. The corrugations **49** and **51** grip the conductor and the arcuate washer **47** is flexed thereby exerting a force against the head of the screw so as to keep it tight. Next a second conductor can be positioned over the first and fastened to the short leg **42**.

It is to be noted that for each pair of conductors, two lugs **48** are available which are useful for the temporary connection of test leads by means of prods, alligator clips or the like.

It is also to be noted that as the sections **11** are joined, the surfaces **25** on each side of each section abut and are coplanar with those of adjoining sections so that two substantially planar elongated surfaces are formed at the top of the unit. These surfaces are for the application of a marker strip, such as a strip of gummed paper or tape, to which indicia can be applied to identify the various terminals.

It is also to be noted that both conductors of a pair to be connected together extend to the same side of the terminal block rather than to opposite sides as is more usual. Additionally the conductors are positioned one above the other. Also, two pairs of conductors, one pair on each side, can be accommodated in the lengthwise space normally used by a single pair. Thus there is a saving in lengthwise space, which is often at a premium, at the price of vertical space, of which more is usually available.

The terminal block has been described as one in which the J-shaped bus bars are oriented with the J lying on its side, with the connecting portions back to back, and the legs horizontal. There is no fundamental reason why the bus bars could not be positioned with the long legs back to back and arranged with each J either upright or upside down. However, such an arrangement would require a redesign of the insulating sections and the configuration illustrated and described is preferred at present.

Throughout the specification reference has been made to "the bottom" or "the top" etc. because it is contemplated that the terminal block will be mounted with the dovetail on the bottom and resting on a horizontal surface. However, there is no reason why the terminal block cannot be installed on an inclined surface or on a vertical surface, or, for that matter, upside down on the ceiling. Therefore, the terms "up," "down" and the like are to be understood to be used in an illustrative rather than a limiting sense.

Although a preferred embodiment of the invention has been described in considerable detail for illustrative purpurposes, many modifications within the spirit of the invention will occur to those skilled in the art. It is therefore desired that the invention not be limited to the particular embodiment which has been described.

What is claimed is:

1. A sectional terminal block, comprising, a plurality of bus bars, each of said bus bars comprising a generally flat conductive strip formed in the general shape of the letter J so as to include a long leg, a short leg substantially parallel thereto, and a connecting portion, said bus bars being arranged in pairs with the connecting portions adjacent to but insulated from each other and with corresponding legs of the two bars substantially coplanar and extending in opposite directions, away from each other, each leg of each bus bar being provided with means for connecting an external conductor thereto, and a plurality of upstanding insulating sections, each section having a support portion and each having a generally flat central portion and each formed with a plurality of laterally extending protuberances on each face opposite each other, said sections being arranged side by side with a pair of said bus bars arranged as aforesaid between each two adjacent sections, said central portions being arranged to extend between adjacent conductor connecting means, said protuberances on each face being shaped and located so that corresponding portions on adjacent sections abut each other and form a pair of spaced cavities to retain said bus bars in position therein, each said pair of cavities being arranged to open outwardly in opposite directions, each said cavity also being arranged to open upwardly, said protuberances on each face including a first protuberance extending between said pair of adjacent bus bars, said first protuberance also extending between said adjacent support portion and each said bus bar.

2. A terminal block according to claim **1** in which said support portions on said sections are dovetail portions projecting therefrom, said dovetail portions being aligned in order to fit between the flanges of a standard mounting base, and in which said first protuberance on each face has a first stem portion and a second main portion and has a generally T-shaped profile, said stem portion extending between said pair of bus bars adjacent thereto, said second portion extending between each said bus bar and said dovetail portion adjacent thereto, and in which said protuberances on each face include second and third protuberances respective disposed on opposite sides of said stem portion and forming a pair of generally L-shaped slots therebetween receiving said pair of bus bars.

3. A terminal block according to claim 2 in which said second portion of the first protuberance on each face has a pair of shoulder portions disposed at opposite ends thereof for supporting the oppositely disposed ends of the long legs of said pair of adjacent bus bars, each said shoulder portion having a recess adjacent thereto for receiving a conductor connecting screw, and in which said second and third protuberances have respective stem portions for supporting the oppositely disposed ends of the short legs of said pair of adjacent bus bars, each said stem portion having a recess adjacent thereto for receiving a conductor connecting screw.

4. A terminal block according to claim 3 in which each section is formed on one face with an elongate vane portion extending from and formed on the stem portion thereof, and each section is formed on the other face with an elongate portion complementary to said vane portion whereby upon assembly said vane portion of one section engages said complementary portion of the adjacent section.

5. A terminal block according to claim 4 in which each of said means for connecting comprises a machine screw threaded into a leg of said bar and disposed between said pair of central portions adjacent thereto, said machine screw being provided with a conductive washer held captive near the head thereof, said washer being generally rectangular in shape and arranged to engage said central portions adjacent thereto, and said washer being formed of a resilient metal in a slightly arcuate profile for ease of connecting a conductor to said leg, and in which said washer is formed with an upstanding lug to facilitate the temporary connection of a test lead thereto.

6. A sectional terminal block, comprising, a plurality of bus bars, each of said bus bars comprising a generally flat conductive strip formed in the general shape of the letter J so as to include a long leg, a short leg substantially parallel thereto, and a connecting portion, said bus bars being arranged in pairs with the connecting portions adjacent to but insulated from each other and with corresponding legs of the two bars substantially coplanar and extending in opposite directions, away from each other, each leg of each bus bar being provided with means for connecting an external conductor thereto, and a plurality of upstanding insulating sections each having a generally flat central portion and each formed with a plurality of laterally extending protuberances on each face opposite each other, said sections being arranged side by side with a pair of said bus bars arranged as

aforesaid between each two adjacent sections, said protuberances being shaped and located so that corresponding portions on adjacent sections abut each other and retain said bus bars in position, each section also being formed on one face with at least one extending portion formed on and extending beyond said protuberances and formed on the other face with at least one recess in said protuberances complementary to said extending portion, whereby upon assembly said extending portion of one section fits into said recess of the adjacent section, and in which each of said means for connecting comprises a machine screw threaded into a leg of said bar and provided with a conductive washer held captive near the head thereof, said washer being generally rectangular in shape and being formed of a resilient metal in a slightly arcuate profile, and in which each leg of said bus bar and each washer is formed with corrugations on facing surfaces to enhance their engagement with an external conductor.

7. A terminal block according to claim 6 in which each of said insulating sections is formed with two planar surfaces each of which is so located thereon as to be coplanar and contiguous with a like surface on an adjacent section when said sections are assembled and which surfaces form areas suitable for the application thereto of marker strips bearing indicia.

8. A terminal block according to claim 7 in which each of said bus bars is positioned with its two legs in different generally horizontal planes with the long leg lowermost, the connecting portion upstanding, and the short leg uppermost.

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