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Ege

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[54] **FUSE PANEL ASSEMBLY FOR MOUNTING VARYING SIZE FUSES**

[75] Inventor: **Hans Ege,** Des Plaines, Ill.

[73] Assignee: **Underwriters Safety Device Co.,** Chicago, Ill.

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[52] **U.S. Cl.** ..... **317/116,** 339/219 F, 337/256

[51] **Int. Cl.** **H02b 9/00**

[58] **Field of Search** ..... 337/256, 260, 261, 268; 174/52 R, 53, 59, 139, 145, 177; 317/114, 116, 118; 339/150 F, 219 F, 252 F, 253 F, 256 C, 258 F, 259 F, 262 F, 263 L, 265 F, 266 F, 270 F

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Primary Examiner—Robert K. Schaefer
Assistant Examiner—Gerald P. Tolin
Attorney, Agent, or Firm—Lockwood, Dewey, Zickert & Alex

[57] **ABSTRACT**

Disclosed is a versatile fuse panel assembly which includes a block adapted to accommodate any sequence of predetermined long and short cartridge fuses such as, for example, 30 and 60 amp cartridge fuses.

The panel assembly includes an insulating-material fuse panel block adapted to receive a buss bar-like connector along one edge, and has means thereon for receiving a first respective row of a plurality of either 30 or 60 amp cartridge fuse clips electrically attached to the connector. Parallel to that edge of the block and spaced-apart therefrom are a plurality of second rows of fuse connector-receiving means. For example, the block can be designed to accommodate a plurality of both 30 and 60 amp fuses. The second 30 amp row of fuse connector receiving means is relatively close to the buss bar situs and the second 60 amp row is further away from the buss bar situs, each row being spaced-apart from the buss bar a proper distance so that the appropriate fuse holders can be attached, during assembly of the panel, along the respective rows to provide proper spacing for receiving the desired fuses between respective pairs of fuse clips.

The versatile fuse panel assembly makes it possible to custom assemble a panel for almost any combination, sequence or configuration of 60 and 30 amp fuses without the extra tooling costs associated with fabricating a special panel for each combination. Thus, the manufacturer's representative can offer such custom panel assemblies at a predetermined and economical price regardless of configuration for any quantities and for any combinations comprising the predetermined size fuses, e.g., 30 and 60 amp fuses.

5 Claims, 7 Drawing Figures

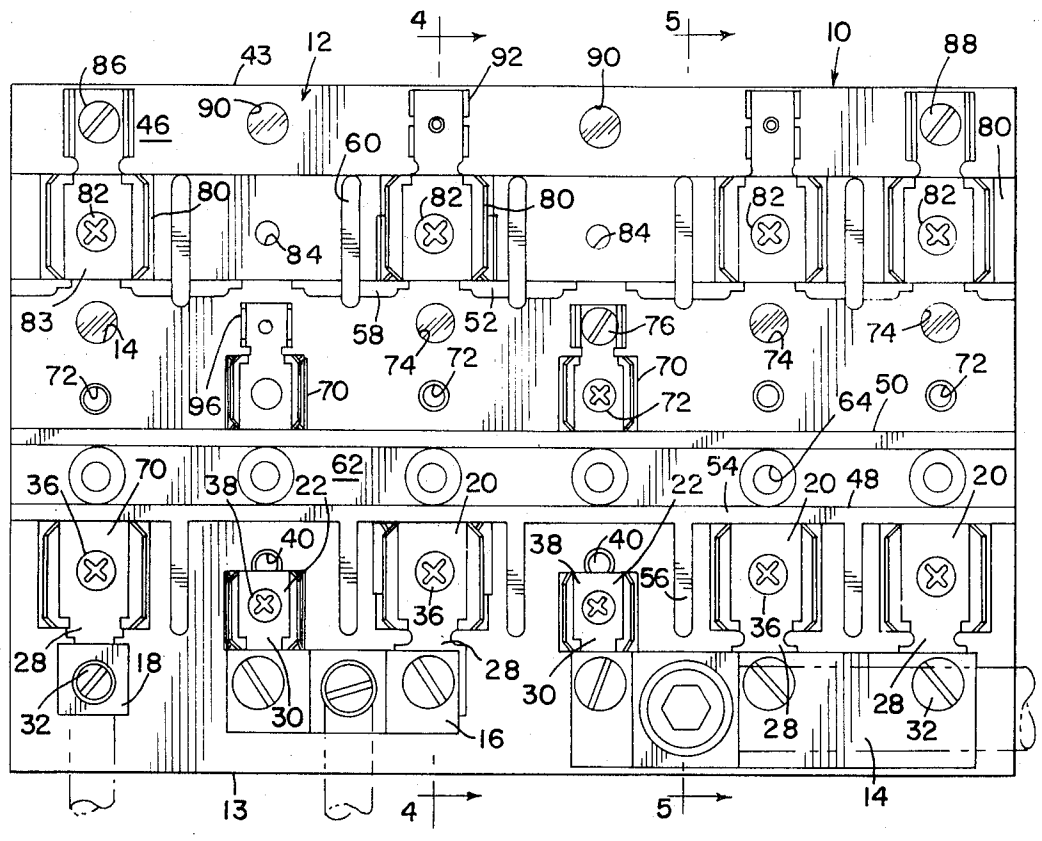


FIG. 1

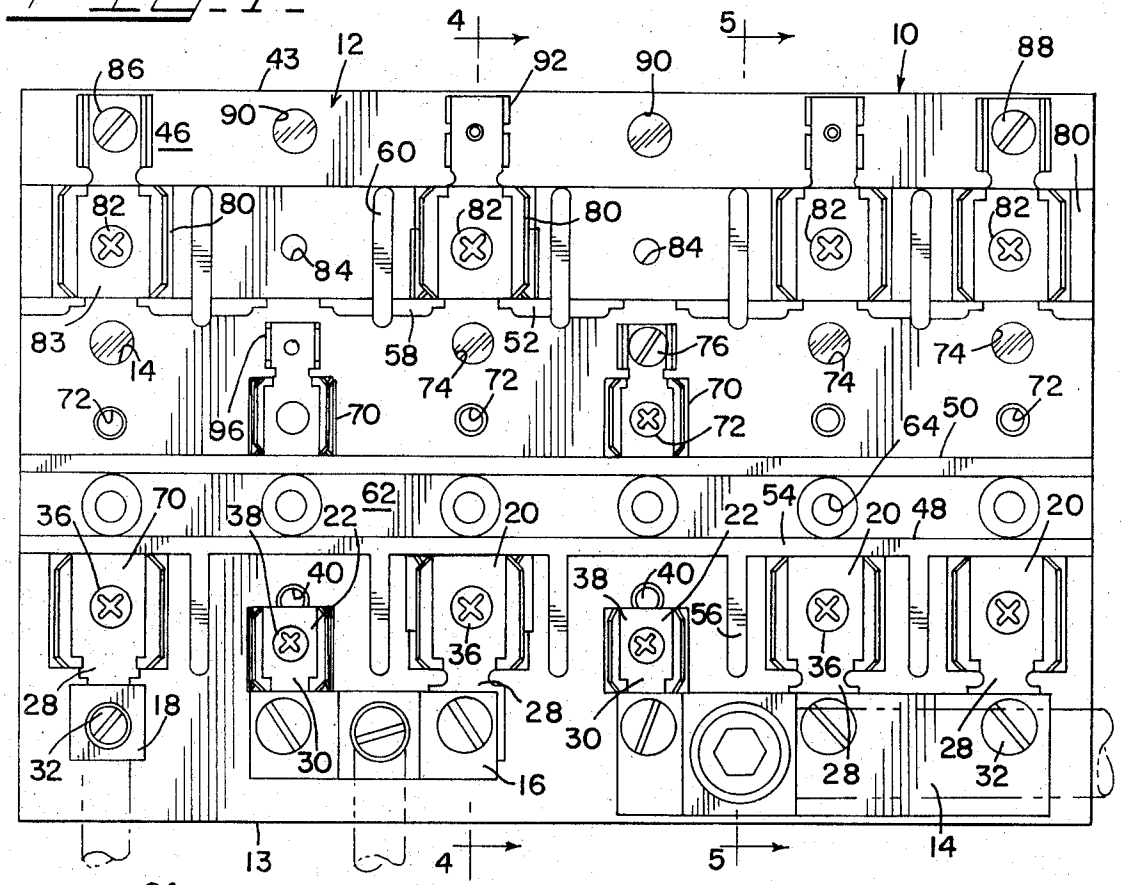


FIG. 2

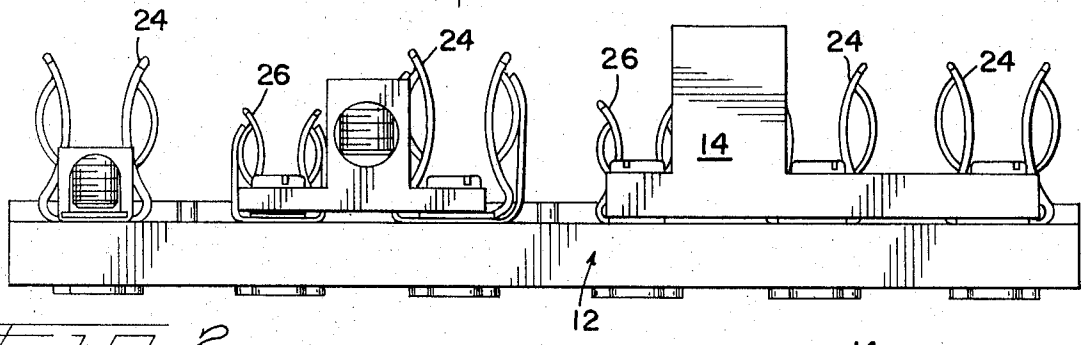
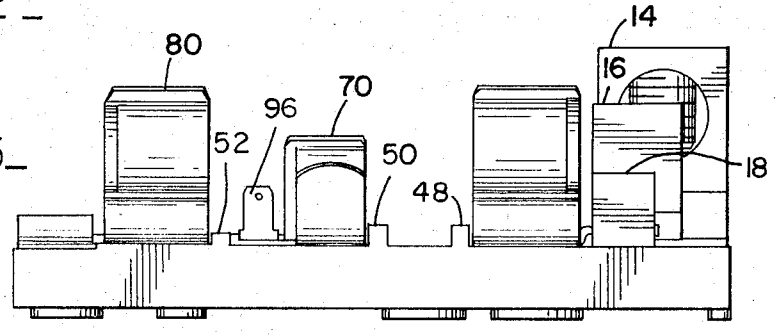


FIG. 3



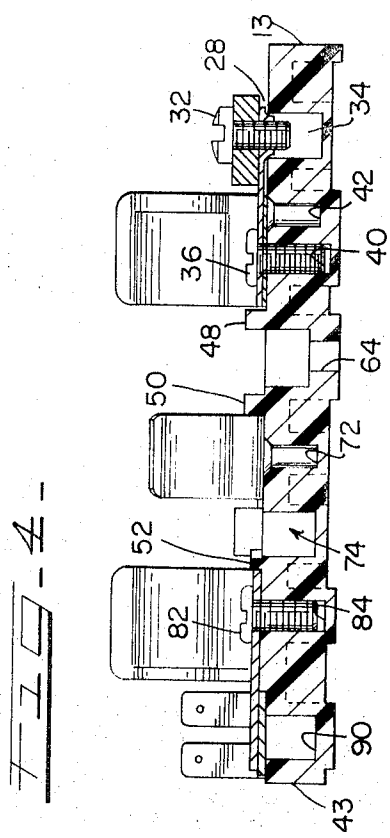


FIG-4-

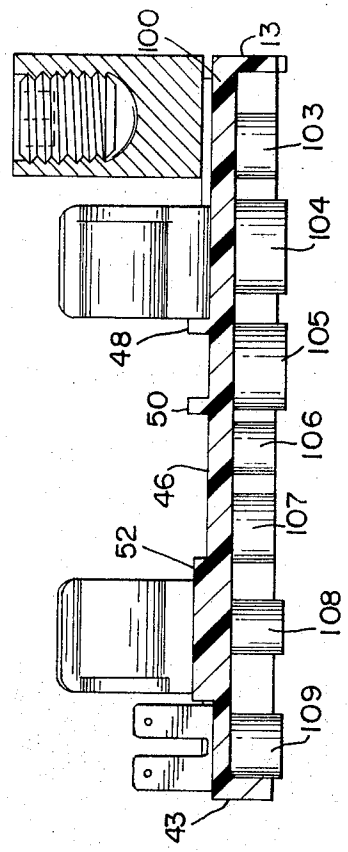


FIG-5-

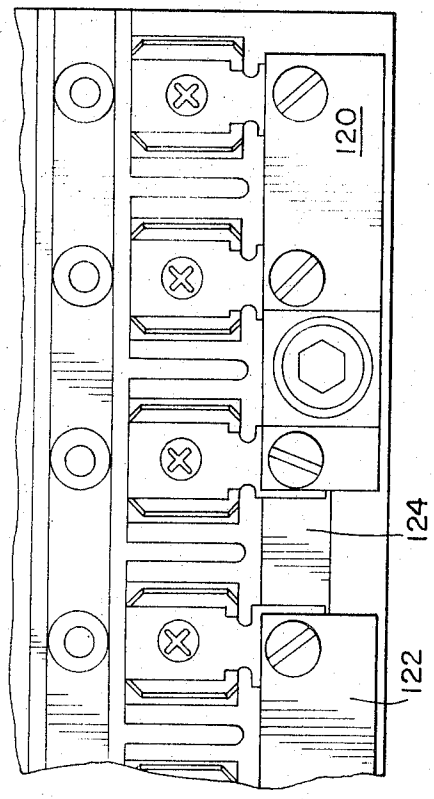


FIG-6-

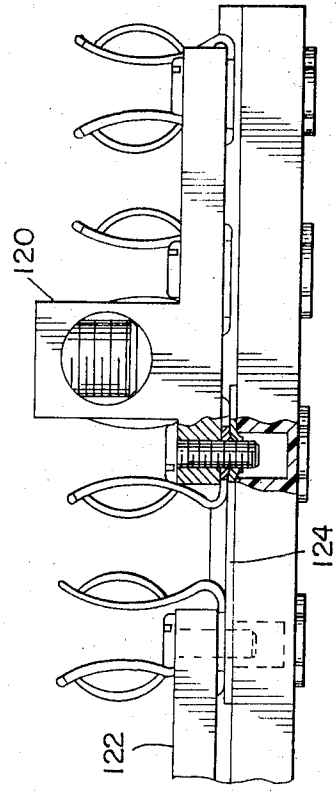


FIG-7-

FUSE PANEL ASSEMBLY FOR MOUNTING VARYING SIZE FUSES

This invention relates to a versatile fuse panel assembly which utilizes a fuse panel block of insulating material adapted to accommodate any parallel arrangement or lateral sequence of predetermined amperage cartridge fuses. This invention provides a compact versatile cartridge fuse panel assembly which can be utilized in the manufacture of electric furnaces, boilers, heaters, and the like.

Although electric furnaces, boilers, heaters and the like are manufactured in relatively large numbers by individual manufacturers, the volume of this business in terms of the numbers of units produced is sufficiently small that tooling costs associated with the manufacture of custom made fuse panel blocks and other "custom-made" components tends to be relatively high on a per-unit basis.

In addition, depending on the specific requirements of the particular model of furnace, boiler, heater and the like, the fuse panel assemblies may require provision for use of all 60 amp fuses, all 30 amp fuses, or any one of many possible combinations of these cartridge fuses. For the purpose of providing economies and efficient wiring arrangement within the manufactured unit, it may be desirable to provide a fuse panel assembly having a particular sequence of 60 and 30 amp cartridge fuses arranged from side-to-side.

It is an object of the present invention to provide a versatile fuse panel block which provides the capability of assembling on the one fuse panel block an assembly comprising any combination of 30 and 60 amp fuses, and to provide a fuse panel assembly in which the desired combination of 30 and 60 amp fuses does not involve interference of the fuses with each other.

It is also an object of the present invention to provide a fuse panel block, and a fuse panel assembly which makes it possible to custom assemble almost any combination of different amperage fuses such as, for example, any combination of 30 and 60 amp fuses, without the extra tooling associated with fabricating a special panel for each desired combination pattern.

It is a further object of the present invention to provide a fuse panel block, and a fuse panel assembly which is extremely versatile, and which can be easily manufactured in very large quantities, and which can be used to custom assemble any desired combination of fuses wherein the fuse panel assembly manufacturer's representative can offer a predetermined price, regardless of configuration, for any combinations comprising the predetermined amp fuses.

It is a further object of the present invention to provide a versatile fuse panel assembly which utilizes a single configuration versatile fuse panel assembly block regardless of configuration pattern or sizes of the cartridge fuses to be assembled thereon, wherein the fuse panel assembly manufacturer can maintain a simplified inventory in that only a versatile single configuration fuse panel block item need be stocked in order to supply blocks for all the custom assemblies, and in order to provide the capability for custom assembling the many desired configurations of the 30 amp and 60 amp fuses, for example.

These and other objects which will be apparent hereinafter are all achieved in accordance with the present invention which is described herein in connection with

particularly preferred embodiments, and with the aid of the accompanying drawings, in which:

FIG. **1** is a top plan view of a fuse panel assembly in accordance with the present invention;

FIG. **2** is an edge view taken towards the bottom edge of the assembly as shown in FIG. **1**;

FIG. **3** is a side view taken towards the left side of the assembly as shown in FIG. **1**;

FIG. **4** is a cross-sectional view taken approximately along the line **4—4** in FIG. **1**;

FIG. **5** is a cross-sectional view taken approximately along the lines **5—5** of FIG. **1**;

FIG. **6** is a fragmentary top plan view of a portion of a lower right-hand portion of a panel assembly as shown in FIG. **1** but showing an alternative buss bar assembly; and

FIG. **7** is an edge fragmentary view of the structure shown in FIG. **6**, taken towards the edge shown at the bottom of FIG. **6**.

In accordance with the present invention, a fuse panel assembly utilizes a fuse panel block of insulating material adapted to receive a buss bar-like connector along one edge thereof, and having means thereon for receiving a plurality of various amperage fuse connectors or clips electrically attached thereto wherein the first clips are arranged along a first row parallel to that one edge. The fuse panel block also includes a plurality of second rows of fuse connector receiving means, wherein the respective second rows are also parallel to that edge of the block. The respective second rows are spaced-apart from the first rows a proper distance so that appropriate fuse holders attached to the block along the respective rows provide proper spacing for receiving respective fuses, e.g., 30 amp, 60 amp, or the like, between respective pairs.

Although the present invention is illustrated by the description of the particularly preferred embodiment in which the fuse panel assembly can accommodate all 30 amp, all 60 amp, or any combination of 30 and 60 amp cartridge fuses, it will be appreciated that the invention is not limited thereto, and that the panel block can be arranged, if desired, to accommodate a larger number of types of cartridge fuses, and different amperage fuses.

Referring now to the drawings, a fuse panel assembly in accordance with the present invention is generally indicated by the numeral **10**. The fuse panel block fabricated from insulating material is indicated generally by the numeral **12**. Along a first edge **13** of block **12** are situated relatively large connector means **14, 16,** and **18**. Connectors **14** and **16** can be regarded as buss bars, and connector **18** is adapted to accommodate a single circuit. It is noted the embodiments illustrated in the drawings, and particularly in FIGS. **1** and **6**, are presented merely for illustration, to show that there is great flexibility in the arrangement and size of the buss bars, and great versatility in the configuration of the fuses and circuit distribution from the respective input connectors.

As seen in FIG. **1**, a plurality of respective 60 amp energized fuse clips **20** and a plurality of respective 30 amp energized fuse clips **22** are shown electrically connected to respective connectors **14, 16,** or **18**. These respective clips **20, 22** include fuse cap-engaging means **24, 26** respectively, and respective tongues **28, 30**. Respective tongues **28, 30** are integral with clips **20, 22,** respectively, and are in direct electrical contact

with respective electrical connectors **14, 16,** or **18** and are secured thereagainst, to fix respective connectors **14, 16,** or **18** with respect to block **12,** by suitable fastening means such as screws **32.**

Fuse clips **20, 22** are secured to block **12** by means of suitable fasteners **36, 38,** respectively, which pass therethrough and are tightly received in respective recesses **40, 42.** Recesses **40, 42** are circular and are so sized that fasteners **36, 38** are self-tapping when seated therein.

Referring now to FIG. **4,** fuse clips **20** are relatively large, and the fastener-receiving recess **40** is spaced-apart from buss-bar recess **34** by a greater distance than the distance between small clip recess **42** and buss-bar recess **34.** The distance between recess **42** and recess **34** is smaller in order to accommodate the relatively small 30 amp fuse clips **22, 22.** Thus, relatively large recesses **34** (see FIG. **4**) are arranged in a line, or a rank, transversely across the fuse panel block and parallel to edge **13.** A second parallel rank or line of relatively small recesses **42** are spaced transversely across the block **12,** and a third parallel rank or line of recesses **40** are spaced transversely across the block also. It is desirable to have separate relatively large and small diameter recesses **40** and **42** along these ranks of recesses only when relatively large and relatively small diameter fasteners **36, 38** are used. Otherwise, if the fasteners **36, 38** are to be of the same diameter, a single rank of recesses corresponding to the rank of recesses **40** or rank of recesses **42** can be employed.

It is noted that these recesses are also situated in file, that is, in a configuration wherein respective sets of recesses are aligned along a straight line between an input edge **13** and a distribution edge **43** of the block **12.**

This "rank and file" arrangement is an important aspect of the present invention. When used herein, the term "rank" refers to the side-by-side arrangement of similar components, or structural features, along a line which extends transversely across the panel **12,** that is, along a line which is substantially parallel to edge **13.** As used herein, the term "file" refers to the linear arrangement of respective components or structural features along a line which passes perpendicularly between edges **13** and **43.**

As shown in FIGS. **1, 3,** and **5,** the preferred block in accordance with the present invention includes on the mounting face, which is generally indicated by the numeral **46,** barrier bosses **48, 50** and **52.** The first barrier boss **48** includes a transversely extending portion **54** and peninsulas **56.** Transverse portion **54** is parallel to the ranks of the openings **40, 42,** that is, parallel to edge **13** and peninsulas or fingers **56** are parallel to "file" lines, that is, perpendicular to edges **13, 43.**

Each boss **52** also includes a transverse portion **58** parallel to edges **13** and **43,** and a "file" portion **60,** that is, the portion of boss **52** which is perpendicular with respect to edges **13, 43.**

Boss **50,** in the preferred illustrated embodiment is a single elongated ridge rectangular in cross section extending along a line parallel to edge **13,** and positioned between bosses **48** and **52.**

An apparent recess **62** is thus formed between portions **54** of barrier boss **48** and transversely extending barrier boss **50.** A plurality of openings **64** (see FIGS. **1** and **4**) are provided in recess **62** for the purpose of receiving fasteners (not shown) therein for mounting block **12** to a suitable support (not shown).

Although these openings **64** are in a "rank" inasmuch as they are preferably positioned in the elongated recess **62** between barriers **48, 50,** it is not essential that openings **64** be arranged in "file" that is, under a line drawn through the respective sets of structures and recesses.

In the illustrated embodiment, two relatively small fuse clips **70, 70** are positioned against barrier **50,** and are secured against face **46** of block **12** and fixed with respect to block **12** by suitable fastening means such as fastener screws **72, 72** which are received in snugly fitting recess **73.** Recess **72** is a "dead-end" recess sized to snugly receive fastener **73** therein whereby fastener **73** is self-tapping when driven home into recess **72.**

A rank of relatively large "dead-end" recesses **74** are provided in respective files with respective recesses **72** to accommodate lead-fastener screws **76** by means of which electrical leads (not shown) are electrically secured to cartridge fuse clips **70, 70.** It is noted that transversely extending portions **58, 58** of bosses **52** have a gap therebetween at each of the "file" lines, and these gaps accommodate the positioning of the electrical leads which can be secured to the smaller fuse clips **70, 70.**

In the illustrated embodiment, a plurality of relatively large fuse clips **80, 80** are arranged along edge **43** and are secured against block **12** to face **46** and against respective opposing portions of respective barrier bosses **58, 58,** by means of suitable fasteners **82** which pass through the respective faces **83** of clips **80.** Fasteners **82, 82** are tightly received in dead-end recesses **84, 84** which are sized to cause self-tapping seating of fasteners **82, 82** therein as fasteners **82, 82** are driven home. Respective cartridge clips **80** include respective tongues **86** to which suitable means for securing electrical leads to clips **80** are provided, e.g., screws **88** which are received in large recesses **90** or blades **92** of quick-connect fasteners. In this regard, it is noted that smaller cartridge fuse clips **70** can utilize either electrical lead fastener screws **76** or blades **96** for quick-connect fastener systems to electrically connect wires (not shown) to clips **70.**

Again, it is noted that respective recesses **34, 40, 42, 72, 74, 84,** and **90** are arranged in respective ranks transversely, that is parallel with edges **13;** and each respective set of recesses **34, 40, 42, 72, 74, 84** and **90** is arranged along a line extending perpendicular to edges **13, 43.**

Thus, a sub-set of these recesses including a respective recess **40, 42, 72,** and **84** is provided to secure respective pairs of clips **22, 70,** for 30 amp fuses, and respective pairs of clips **20, 80** for 60 amp fuses. Each respective sub-set of recesses **40, 42, 72,** and **84** is positioned along a "file" line extending perpendicular to edges **13** and **43** to accommodate or receive, in each set or file, respective fastening means **36, 38, 73, 82** for securing energized small fuse clips **22** or an energized large fuse clip **20** and respective small fuse clip **70** or a respective large fuse clip **80,** whereby a cooperating pair of small fuse clips **22, 70** or a cooperating pair of large fuse clips **20, 80** can be positioned in overlapping regions along each respective file line. Also, it will be appreciated from a consideration of FIG. **1** that the elevated ridge referred to above as barrier **48** delineates the marginal region of face **46** adjacent edge **13** to which the energized clips **20, 22** are secured, and that respective barriers **50** and **52** delineate regions of face

46 in which respective ranks of clips 70, and 80 are secured to face 46 of block 12.

Referring now to the cross-sectional views of FIGS. 4 and 5, it will be appreciated that block 12, in accordance with the present invention, can be manufactured as an integral element, for example, by injection molding, an insulating plastic material in a mold cavity (not shown) constructed to provide a face panel 100, dependent peripheral skirts 102, and a plurality of "posts" 103, 104, 105, 106, 107, 108, 109, into which respective recesses 34, 42, 40, passageway 64, recesses 72, 74, 84, and 90 extend, as illustrated in FIGS. 4 and 5. Thus, the block 12 in accordance with the present invention is readily and economically manufactured in large quantities, and the relative sizes of the recesses 34, 42, 40, 64, 72, 74, 84, and 90 are pre-determined by corresponding sizing of mold elements (not shown).

In the embodiment illustrated in FIGS. 1–5, inclusive, the respective energized buss connectors 14, 16, and single wire connector 18 are separate from each other, wherein three separate energized leads are utilized. In the embodiment shown in FIGS. 6 and 7, for example, two buss-bar connectors 120, 122, each of which corresponds to connector 14 shown in FIGS. 1–5, utilize and are electrically connected therebetween by a bridging conductor 124. In such an arrangement a single energized electrical wire is secured to either buss bar 120, 122.

I claim:

1. A mounting block for a fuse mounting panel assembly adapted to retain pluralities of varying size fuses in parallel side-by-side relation in file thereon and adapted to mount varying input electrical connections thereon, said mounting block comprising: a mounting surface adapted to receive fuse clips for fastening to the ends of fuses, terminal connectors, buss bars, and fasteners in varying numbers and orientations, said mounting surface including means adapted for fastening said panel to an external member, a plurality of fuse clip mounting means located in ranks parallel to one side of said surface and also located in files perpendicular to said one side, a primary rank of said mounting means adapted to receive mountings for input fuse clips for fastening to one end of either of short and long fuses, a plurality of secondary ranks of mounting means, one of said secondary ranks adapted to receive mountings for output fuse clips for fastening the other end of short fuses, another of said secondary ranks adapted to receive mountings for output fuse clips for fastening to the other end of long fuses, said secondary ranks located in spaced apart relation from said primary rank, said secondary rank for receiving output fuse clips of short fuses being located between said primary rank and said secondary rank for receiving output fuse clips of long fuses, first raised transverse barrier means for increasing the surface path of any electrical arc between any input and output fuse clips which may be mounted on said surface, said first transverse barrier means located between said primary rank of mounting means and said one secondary rank of mounting means for output fuse clips of short fuses, second raised transverse barrier means for increasing the surface path of any electrical arc between any output fuse clips for short fuses and any output fuse clips for long fuses which may be mounted on said block, said second transverse barrier means located between said secondary ranks of mounting means for output fuse clips, a plurality of in-line raised barrier means between portions of said files of said mounting means for increasing the surface path of an electrical arc between fuse clips mounted in separate files, segments of said in-line barrier means located between said input fuse clip mounting means and extending from said first raised transverse barrier means toward said one side of said surface, a substantially flat area across said mounting surface between the ends of said segments of in-line barrier means and said one side whereby said block is adapted to mount a plurality of combinations of either of input buss bars and terminal connectors connectible to any input fuse clips mounted on said block.

2. The mounting block of claim 1 wherein said fuse clip mounting means includes a mounting hole for receiving a fuse clip fastener, and a second hole in said surface adjacent to said mounting hole in file therewith adapted to receive the end of a terminal connector fastener attachable to said fuse clip.

3. The mounting block of claim 1 wherein said mounting holes are self-threading.

4. The mounting block of claim 1 wherein said first raised transverse barrier means includes a pair of wall structures located in parallel spaced relation to each other and a rank of holes in said mounting surface between said walls adapted to receive said fastener means for mounting said block to an external member.

5. The mounting block of claim 1 wherein said second raised transverse barrier means includes notched cut-outs in each file adapted for mounting a terminal connector to each of said output fuse clips for mounting a short fuse which may be mounted on said block.

* * * * *