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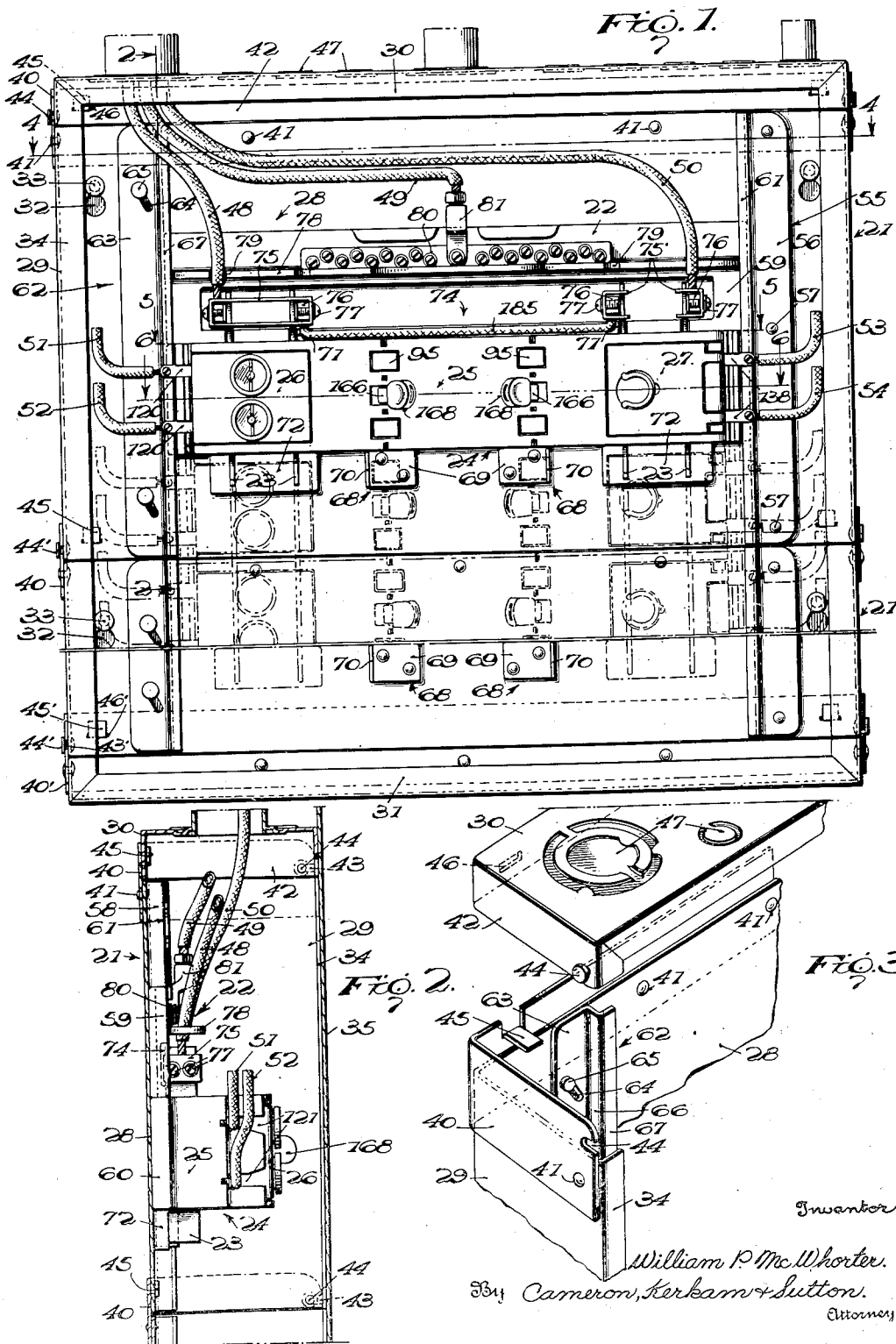
W. P. McWHORTER

2,156,479

PANEL BOARD

Filed Aug. 24, 1936

3 Sheets-Sheet 1



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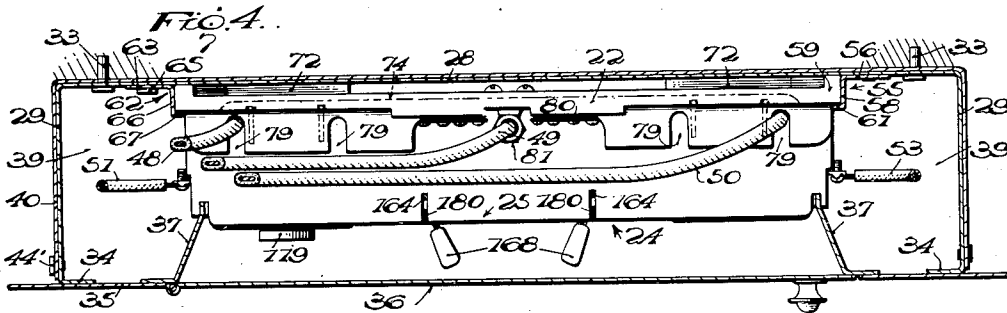
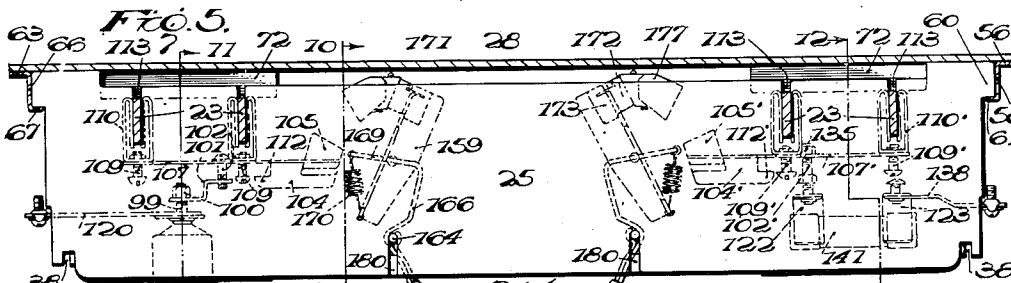
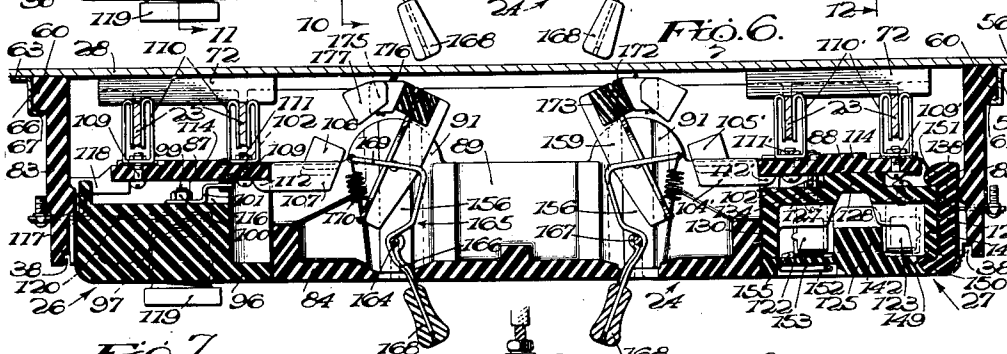
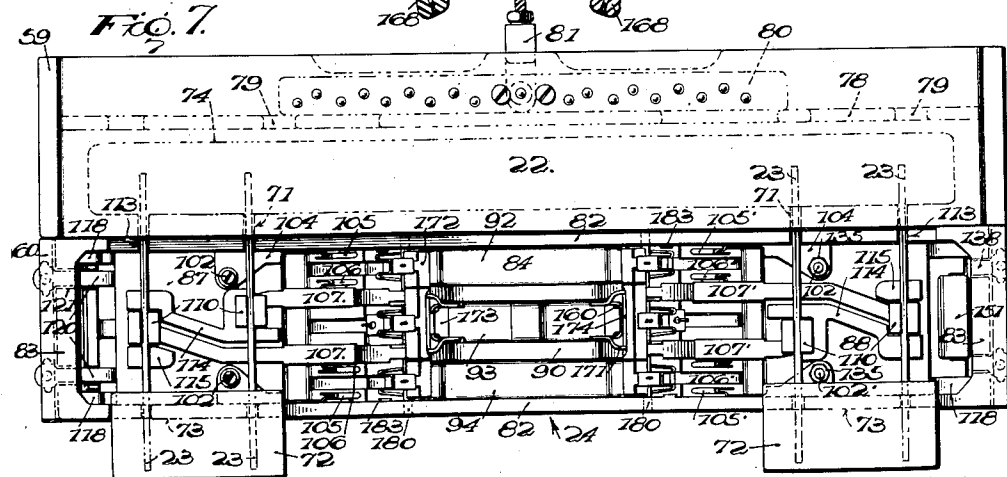
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PANEL BOARD

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PANEL BOARD

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20 Claims. (Cl. 175-309)

This invention relates to panel board systems and more particularly to panel board assemblies of the type used for connecting and fusing the electrical distribution circuits of a building to the service mains.

Heretofore, when a contractor has undertaken to provide the electrical distribution system for any particular building and has decided upon the type and size of panel board needed to fulfill the requirements of that system, it has usually been necessary to have the board made up specially by some panel board manufacturer. This procedure is not only costly but also tends to delay completion of the building. For the manufacturer or the wholesale distributor to carry in stock a sufficient number of different panel board arrangements to meet the daily demands of the trade would require a stock of such size as to be prohibitive from the standpoints of both storage space and investment. Consequently, in most cases the electrical contractor has had to place a special order for his panel board equipment and to patiently await construction and delivery by the manufacturer before completing his work.

It is therefore one of the objects of the present invention to provide a panel board system of component elements of novel construction which may be manufactured and stocked in quantity and assembled in numerous different combinations so as to produce any desired arrangement of circuit connections, switches and fuses.

Another object is to provide a panel board system comprising a housing unit, molded terminal block, base block, plug fuse and cartridge fuse units, and conductor and switch elements, all of which are of novel construction and especially adapted to cooperate with one another in the building up of panel board assemblies of varying sizes and circuit arrangements.

A further object is to provide a plurality of units or elements of distinctive construction which may be manufactured and stocked as standard panel board parts and combined with one another in many different arrangements to produce panel board assemblies of various designs.

Still another object is to provide a panel board section or branch circuit unit of new and improved construction the component parts of which may be separately manufactured in an economical manner and readily assembled with a minimum of effort.

A still further object is to provide a panel board section of the built-up type in which fuses of the plug and cartridge types may be used interchangeably and wherein either single, double or

even triple pole switches, or various combinations thereof, may be employed.

Another object is to provide a base block unit for panel boards of novel form which may be molded in one piece of non-conducting material and on which may be mounted the various elements of the fuse and switch units and the current conductor elements without requiring any machining or drilling after removal of the unit from the mold.

Another object is to provide a pair of fuse units of new and improved construction, one adapted to receive plug fuses and the other cartridge fuses, which are interchangeably mountable in a panel board section, the cartridge fuse unit also embodying a novel form of hinged cover which serves to insert the fuses in and withdraw them from the fuse clips without the necessity for actually taking hold of the fuses with the fingers.

Another object is to provide an improved housing or cabinet unit for panel board assemblies which is so constructed that the elements of the assembly may be properly mounted therein without the use of screws or other fastening means.

Another object is to provide a novel form of switch especially adapted for mounting without the use of tools in the base block unit of the present invention, the elements of which switch are so constructed as to be capable of providing either a single, double or triple pole switch as desired.

Another object is to provide new and improved means for supporting the bus bars of a panel board assembly and for connecting the service wires and the branch distributing circuits thereto.

These and other objects will appear more fully upon a consideration of the detailed description of the embodiment of the invention which follows. Although only one particular panel board assembly is described and illustrated in the accompanying drawings, it is to be expressly understood that these drawings are for the purpose of illustration only and are not to be construed as defining the scope of the invention, reference being had for this latter purpose to the appended claims.

Referring now to the drawings, wherein like reference characters indicate like parts throughout the several views:

Fig. 1 is a front elevation of a panel board assembly embodying the present invention with the front trim removed, there being only one panel board section or branch circuit unit shown in place although two cabinet or housing units are shown to illustrate the manner in which a panel board of any desired size may be built up from the

units constituting the system of the present invention;

Fig. 2 is a vertical section taken substantially on line 2—2 of Fig. 1 but with the front trim shown in place;

Fig. 3 is a fragmentary perspective view of one corner of the upper end of the assembly of Fig. 1 with the cabinet top cover removed from the body thereof so as to illustrate the construction and manner of assembly of said elements;

Fig. 4 is a horizontal section taken substantially on line 4—4 of Fig. 1 but with the front trim shown in place;

Fig. 5 is a horizontal section taken substantially on line 5—5 of Fig. 1 showing the panel board section or branch circuit unit in plan;

Fig. 6 is a horizontal section through the panel board section taken substantially on line 6—6 of Fig. 1;

Fig. 7 is a rear elevation of the panel board section and terminal block unit of the assembly shown in Fig. 1 illustrating the interior construction of the panel board section;

Fig. 8 is a front elevation of the integrally molded base block unit of the panel board section with all of the fuse, switch, conductor and other detachable elements removed;

Fig. 9 is a horizontal section through the base block unit taken substantially on line 9—9 of Fig. 8;

Figs. 10, 11 and 12 are vertical sections transversely of the panel board section taken substantially on lines 10—10, 11—11 and 12—12, respectively, of Fig. 5;

Fig. 13 is an exploded perspective view of the novel form of switch constituting a part of the present invention which is shown in assembled condition in Figs. 5, 6, 7 and 10;

Fig. 14 is an exploded perspective view of the cartridge fuse unit of the present invention; and

Fig. 15 is a perspective view of the inner surface of the cover of the cartridge fuse unit of Fig. 14 illustrating the manner in which the fuses are carried and properly positioned thereby.

Referring first to Fig. 1, there is shown therein a panel board assembly of the type used for connecting and fusing the electrical distribution circuits of a building to the service mains which is built up in a novel manner of a number of component elements of new and improved structure especially adapted to cooperate with one another in the construction of panel board assemblies of any desired size and arrangement of circuit connections, switches and fuses. As illustrated, the assembly comprises as its principal elements one or more housing or cabinet units 21 in which are removably mounted at least one terminal block unit 22, two pairs of bus bars 23 and as many panel board sections or branch circuit units 24 as may be required to fuse and switch the circuits of the installation in question. Each of the panel board sections 24 is in turn built up of a number of individual elements including a molded base block unit 25, a pair of interchangeable fuse units 26 and 27 which, in the embodiment illustrated, are shown as plug and cartridge fuse units, respectively, and a plurality of switch units of which only the operating levers and handles are visible in Fig. 1. As will be apparent from the detailed description which follows, each of these various units and elements of the panel board system of the present invention is so constructed that the entire assembly may be put together and mounted in place quickly and easily and with a minimum use of tools.

As shown best in Figs. 1—4, each of the housing or cabinet units 21 comprises a body member having a flat rear wall 28 and a pair of side walls 29 extending forwardly therefrom, a top cover 30 and a bottom cover 31, all preferably made of sheet metal. The body members are so constructed, however, that two or more of them may be connected together to form a cabinet of any desired size, in which event it will be understood that only one top cover 30 and one bottom cover 31 are required for the entire cabinet.

In the rear wall 28 of the body member adjacent the top thereof there are provided a pair of hanging openings 32, preferably circular at their bottom ends but narrowed at their upper ends as illustrated, which are adapted to receive the enlarged heads and shanks of suitably formed studs or lugs 33 which may be embedded in or otherwise secured to the wall upon which the panel board assembly is to be mounted. Each of side walls 29 is provided with an inwardly turned flange 34 on which the usual form of removable front trim 35 is adapted to rest. As shown in Fig. 4, the trim 35 is provided with a suitable door 36 of substantially the same width as the long dimension of the panel board sections 24 and a pair of rearwardly extending flanges 37 the rear edges of which are adapted to engage in suitable grooves 38 formed in the top or outer surface of each base block unit 25 closely adjacent the ends thereof so as to form a pair of wiring troughs or gutters 39 extending the full height of the cabinet and in which the branch circuit wires are housed.

The top end of the body member of the cabinet unit and the top cover therefor are provided with cooperating means of novel character whereby the cover and body member may be detachably secured together in assembled relation in an extremely simple and easy manner. As best illustrated in Fig. 3, the upper end of the body member is provided with a sheet metal skirt 40 which is secured to the rear and side walls of the body member in any suitable manner as by rivets 41 and extends above the top edges thereof for a distance slightly less than the depth of the flange 42 of top cover 30. Each of the forward edges of the skirt 40 is provided with a rearwardly extending slot 43 which is adapted to receive the shank of an enlarged headed pin 44 secured to and extending laterally outwardly from the flange 42 of top cover 30. The rear wall of the skirt 40 is then provided with a pair of cut-out tongues which are initially bent downwardly to a forwardly extending position so as to pass through corresponding openings 46 formed in the rear wall of flange 42. With this construction, top cover 30 may be assembled with the body member of the cabinet unit by simply sliding it rearwardly in a horizontal plane in such a manner that the tongues 45 pass through openings 46 and pins 44 are received in slots 43. When thus assembled, the top cover 30 may be locked in place by simply flattening the tongues 45 to vertical positions as indicated in Figs. 1 and 2.

The means by which the bottom cover 31 is detachably connected to the bottom end of the cabinet unit 21 comprise the same elements as those just described in connection with the top cover, but the elements are reversed in so far as the members by which they are carried are concerned; that is, the skirt member 40' with its slots 43' and tongues 45' is secured to the bottom cover 31 instead of to the cabinet body member, while the pins 44' and openings 46' are mounted

on and formed in the bottom end of the body member rather than the cover. By thus making the elements of the connecting means at the top of each cabinet unit complementary to those at the bottom end thereof, it is possible to connect together two or more of said units in the manner indicated in Fig. 1 to form a housing or cabinet of any desired size.

As indicated in Figs. 1, 2 and 3, top cover 30 is preferably provided with a plurality of stamped knock-out portions 47 which are adapted to be removed as desired in order to provide openings through which the service feed mains 48, 49 and 50 and the branch circuit wires 51, 52, 53 and 54 may pass into and out of the cabinet. If desired, bottom cover 31 may also be provided with similar knock-out portions.

In order to avoid the necessity for using screws, bolts, or other fastening means for mounting the terminal block and branch circuit units in the cabinet, the latter is provided with novel means for supporting and holding these units in place which require no tools for manipulation and which, when the panel board is completely assembled, are rendered inaccessible, and hence protected against unauthorized or accidental displacement, by the flanges 37 of trim 38. As shown, the body member of each cabinet unit 21 has fixedly secured to its rear wall 28 adjacent one side thereof and extending the entire height thereof a retaining member 55 having the general configuration of a Z-bar. The rear or bottom flange 56 of this retaining member 55 is suitably secured to rear wall 28 as by rivets 57 and the web 58 thereof projects forwardly a distance slightly greater than the thickness of the base 59 of the terminal block unit 22 and of the shoulder 60 which is formed integrally with and projects outwardly from each end of the base block unit 25 of the panel board section 24. The web 58 terminates in an inwardly directed flange 61 which is adapted to engage the outer surfaces of base 59 of the terminal block unit and shoulder 60 of the panel board section and to hold said units against the rear wall 28 of the cabinet.

The cabinet unit also carries adjacent the other side of rear wall 28 a second retaining member 62 of substantially the same construction as member 55, except that the member 62 is capable of a limited movement relative to rear wall 28 toward and away from member 55. In the embodiment illustrated, the rear or bottom flange 63 of retaining member 62 is provided with a pair of diagonally extending slots 64 in which are engaged the shanks of enlarged headed pins 65 which are secured to and project outwardly from rear wall 28. Slots 64 are so slanted that their upper ends are further away from retaining member 55 than their lower ends, the result being that retaining member 62 tends normally under the influence of gravity to remain in its closest position to retaining member 55; when in this position, the webs 58 and 66 of the two retaining members are spaced apart by a distance approximately equal to the long dimensions of each of the terminal block units and panel board sections. Pins 65 and slots 64 are also so located that when retaining member 62 is in its downward position, in which its inwardly directed flange 67 will engage and retain the end of the base 59 of the terminal block unit and the shoulder 60 on the end of base block unit 25, the upper end of said retaining member is flush with the top edge of rear wall 28 of the cabinet body member.

In addition to retaining members 55 and 62

which hold the terminal block and branch circuit units in place against the rear wall 28 of the cabinet, means are also provided for positively limiting the position of the lowermost branch circuit unit in the cabinet and thereby supporting the same and all other units which lie thereabove. In the embodiment shown, the rear wall 28 of the cabinet body member has secured thereto at the proper distance from its bottom edge and inside of retaining members 55 and 62 a pair of supporting or stop members 68 of substantially L-shape, one arm 69 of each of said members being riveted to rear wall 28 and the other arm 70 extending forwardly or outwardly therefrom in suitable position to form a support or rest for the lowermost panel board section of the assembly. In this connection, it should be noted that the height of the rear wall 28 of each cabinet body member is preferably approximately equal to four times the width of a single panel board section, and that supporting members 68 are so positioned that the upper edges of their forwardly extending arms 70 are spaced above the bottom edge of rear wall 28 by a distance also equal to the width of one panel board section. With these proportions, it is possible to mount two panel board sections and a terminal block unit in a single cabinet unit and still leave the required wiring space on all sides of the assembly. When the panel board assembly requires more than two branch circuit units, two or more cabinet body members are connected together in the manner indicated in Fig. 1, and the forwardly projecting arms 70 of supporting members 68 of all body members but the lowermost ones are either removed or flattened down out of the way so as to not interfere with the installation of the branch circuit units. Alternatively, all of supporting members 68 may be left in their original positions so as to provide spaces equal in width at least to the width of one branch circuit unit between the groups of units supported in each of the connected cabinet body members.

Referring now to the means for supporting the bus bars 23, it will be seen from Figs. 1, 2 and 7 that the upper end of each of the bus bars is supported on, and passes through a suitable positioning groove 71 formed in the lower edge of, the terminal block unit 22 which is formed of a non-conducting material, while the lower ends of said bars are maintained in insulated relationship with respect to the rear wall 28 of the cabinet body member by resting upon a pair of blocks 72, also made of a non-conducting material. As shown best in Figs. 5, 6 and 7, each of blocks 72 extends upwardly beneath the lower side wall of the lowermost panel board section and is provided with a horizontally extending groove 73 in the outer surface thereof in which the side wall of the panel board section is adapted to fit, thereby forming a supporting connection between said section and said block.

The portion of terminal block unit 22 immediately underlying the ends of bus bars 23 is hollowed out or recessed to provide a suitable trough 74 to accommodate the clamps by which the service feed wires 48 and 50 are electrically connected to the bus bars 23. Although the clamps may be of any desired construction, where two bus bars are to be fed in parallel from the same main the clamp may be of the form illustrated at the left in Fig. 1 and comprise a substantially rectangular strap 75 having slots in the opposite walls thereof adjacent the ends to receive the bus

bars and wires and U-shaped clamping members 76 interposed between the ends of the strap and the bus bars and urged toward the latter by screws 77 which are threaded into the ends of the strap. As shown, the feed wire 40 to be connected to the bus bars is held against one of them by the U-shaped clamping member 76, the current also passing from the wire through the strap 76 and the other clamping member 76 to the other bus bar. If separate clamps are desired for each bus bar, it is obvious that, by simply eliminating the central portions of the side walls of clamp 76, individual clamps 76' may be formed, as illustrated at the right in Fig. 1. Such clamps would be used, for instance, where it is desired that the cartridge fused branch circuits 53 and 54 should carry a potential twice that of the plug fused circuits 51 and 52. In such a circuit arrangement, a jumper wire 105 may be provided to connect one end of double clamp 76 with one of individual clamps 76', the other clamp 76' receiving feed wire 50.

Just above the trough 76, the terminal block unit 22 is provided with a forwardly extending barrier 78 having slots 79 therein to accommodate the feed mains, said barrier insulating the connections to the bus bars from the terminal strip 80 by means of which the return wires of the branch circuits are connected to the third wire or neutral service main 40, the latter being connected to terminal strip 80 by any suitable form of connector 81.

The panel board section or branch circuit unit of the present invention is itself of extremely simple and novel construction and is especially adapted, not only to receive fuse units of the plug and cartridge type interchangeably, but also to be assembled with a minimum use of tools. As shown, the base block unit 23 upon which all of the other elements of the section are removably mounted is so designed as to be capable of molding in one piece from any suitable non-conducting material, such as Bakelite. For convenience in describing this unit, the surface or wall thereof through which the switch operating elements extend will be referred to as the top of the unit, although when the latter is mounted in its proper position in the panel board cabinet this wall is actually in a vertical plane facing the door of the cabinet.

As best illustrated in Figs. 5-12, each base block unit 23 comprises a pair of parallel, elongated side walls 82 connected at their ends by end walls 83 and a top wall 84 which connects the central portions of the top edges of side walls 82 but terminates short of the ends of said walls so as to form a pair of identical recesses 85 and 86 at the ends of the base block unit in which the fuse units are adapted to be removably housed. The bottoms of recesses 85 and 86 are formed by supporting platforms 87 and 88, respectively, which connect the side walls 82 at points intermediate the top and bottom edges thereof. Extending lengthwise of the unit between the supporting platforms 87 and 88 are a pair of parallel partition walls 89 and 90 which are integral with top wall 84 at their upper edges and have their lower edges substantially coplanar with the bottom surfaces of platforms 87 and 88, except for a pair of substantially semicircular extensions 91 on each, which extend toward the open bottom of the unit. The function of the extensions 91 will be described later in connection with the description of the switch elements 75 which are adapted to be removably mounted in

the channels 92, 93 and 94 formed between partition walls 89 and 90 and side walls 82.

As the base block unit 23 comes from the mold, there is no machining, drilling or other work to be done thereon in order to fit it for reception of the various fuse, switch and conductor elements other than the removal from the top wall 84 of whichever of six knock-out portions 95 it is desired to remove to accommodate the operating elements of the switches. As shown in the drawings, the middle knock-out portion 95 of each set of three is removed. All other openings, slots and recesses in the walls and platforms of the base block unit shown in the drawings are provided during the molding operation, it being understood that those which do not serve to receive any of the removable elements of the assembly are either necessary or preferable in order to facilitate the molding of the entire unit with as simple a mold as possible.

Although, as previously pointed out, the recesses 85 and 86 are adapted to receive fuse units of either the plug or cartridge type interchangeably, the embodiment of the invention illustrated includes a plug fuse unit 26 in recess 85 and a cartridge fuse unit 27 in recess 86, both units being of novel construction such that they may be interchanged one for the other. As shown best in Figs. 6 and 11, the plug fuse unit 26 comprises a body member 96 molded in one piece of non-conducting material having a pair of recesses 97 formed in the upper surface thereof in which are removably housed fuse receptacles 98 of known type, the contact bolts 99 of said receptacles passing through holes molded in body member 96 into the bottom of recess 85 just above the upper surface of platform 87. Removably secured to the bottom of body member 96 by bolts 99 and nuts 100 are a pair of connector strips 101 which are also threaded to receive the ends of tap bolts or screws 102 which extend upwardly through holes 103 formed in platform 87.

Secured beneath the heads of bolts 102 and in electrical contact through said bolts and connector strips 101 with contact bolts 99 are a pair of conductor members 104 which may be stamped out of relatively thin metal and bent to the shape indicated in the drawings, each of said members lying adjacent one of side walls 82, extending toward the central portion of the branch circuit unit and terminating in a downwardly turned switch jaw 105. Complementary switch jaws 106, also lying in channels 92 and 94 but spaced from jaws 105, are formed on the ends of conductor members 107, the latter being so shaped as to fit over partition walls 89 and 90 and to extend outwardly toward the end of the unit beneath platform 87 to positions underlying holes 100 which are molded in said platform to receive bolts 109. The threaded ends of bolts 109 not only pass through the ends of conductor members 107 but also extend through the bases of a pair of substantially U-shaped bus bar clips 110. The clips 110, conductor members 107 and bolts 109 are held in assembled relation and secured to the platform 87 by suitable nuts 111. Each of conductor members 104 and 107 is provided with a lip portion like that indicated at 112 in Fig. 6 which is adapted to engage the upper surface of platform 87 and thereby lock said member against downward movement under the action of the switch elements later to be described. The bus bar clips 110 thus secured to the under side of platform 87 are spaced from

one another as shown and aligned with slots 113 molded in the lower edges of side walls 82 through which the bus bars 23 are adapted to pass transversely of the panel board section. In order to facilitate assembly and proper positioning of the bus bar clips and conductor members, the under surface of platform 87 is preferably provided with irregularly shaped, downwardly projecting portions 114 and 115 which define the desired locations of said elements.

When the plug fuse unit just described is placed in recess 85, it rests on supporting platform 87 by means of a pair of legs 116 formed integrally with body member 96 adjacent one end thereof and a pair of shoulders 117 formed adjacent the other end of said body member which engage and rest on raised extensions 118 of platform 87. The conductor members 107 are then placed in their proper positions and the bolts 102 passed through holes 103 and threaded into connector strips 101, thereby securing the fuse unit to the platform 87. The bus bar clips 110 and their associated conductor members 107 are, of course, assembled prior to the mounting of the fuse unit in recess 85. When the elements are thus assembled, it is obvious that a combined frictional and electrical connection with the bus bars 23 may be made by simply forcing the panel board section inwardly over the bus bars, permitting the latter to enter slots 113, until the section comes into contact with rear wall 28 of the cabinet and rests thereagainst at its ends, it being noted that the bottom edges of the side walls 82 of the base block unit 25 intermediate the ends thereof terminate a short distance above said rear wall. With this construction, a pair of current conducting paths are provided with the bus bars 23 through their associated clips 110 and conductor members 107 to switch jaws 106 whence the current may flow, upon the closing of the circuits to the complementary switch jaws 105, through conductor members 104, bolts 102, connector strips 101 and contact bolts 99 to the plug fuses 119 which are adapted to be screwed into receptacles 98 in the usual manner. The circuits continue from fuses 119 through feeder straps 120 which extend outwardly from the fuse unit 26 through openings 121 formed in the end wall 83 of base block unit 25, the outer ends of said feeder straps 120 being adapted to have connected thereto the branch circuit wires 51 and 52.

The cartridge fuse unit 27 which is shown housed in recess 86 is of the same external dimensions as plug fuse unit 26 so as to be interchangeable therewith, and is also adapted to take care of two branch circuits which may be fed from the other pair of bus bars 23. The construction of the cartridge fuse unit is best illustrated in Figs. 6, 12, 14 and 15, and comprises, in addition to two pairs of fuse clips 122 and 123, three separately moldable elements of non-conducting material which may be readily assembled together without the aid of any tools whatsoever—that is, a base block 124, a cover member 125, and a hinge-forming member 126 which is adapted to hold the cover to the base block in hinged relationship.

As shown, the bottom wall 127 of base block 124 is provided with a downwardly projecting portion 128 which extends transversely across the central portion thereof and a plurality of legs 129 projecting from the inner end wall 130 of said block by means of which the fuse unit is supported on platform 88 with the metallic elements of said unit out of contact with the bolts

100' which secure the bus bar clips 110' to the under surface of said platform 88. The upper surface of bottom wall 127 of the base block 124 is provided with two pairs of suitably shaped recesses 131 and 132 in which the fuse clips 122 and 123, respectively, are adapted to be seated and held against turning out of their proper positions. Recesses 131 are provided with holes 133 extending through bottom wall 127 in alignment with the holes 103' formed in supporting platform 88 through which pass the bolts 102' holding the conductor members 104' and their associated switch jaws 105' in secured position beneath platform 88. It will be noted that the bolts 102' of the cartridge fuse unit are longer than the corresponding bolts 102 of the plug fuse unit and that they pass downwardly through fuse clips 122, holes 133 and holes 103', having lock nuts 134 which thread up against the lower surface of bottom wall 127 of base block 124 as well as nuts 135 which secure the conductor members 104' thereto. Fuse clips 123 are fixed in their recesses 132 by bolts 136 which not only extend upwardly both through holes 137 formed in said recesses and through the fuse clips themselves but are also threaded into the inner ends of a pair of feeder straps 138 which extend outwardly through suitable openings 139 formed in the outer end wall 140 of base block 124 and are connected to branch circuit wires 53 and 54.

The cover member 125 of cartridge fuse unit 27 is adapted to be hingedly associated with base block 124 and to serve both as a cover for the unit and as a carrier for the cartridge fuses 141 which are mounted therein. As best illustrated in Figs. 14 and 15, there is formed integrally with the under side of the cover member 125 a downwardly projecting, transversely extending carrier member 142 in which are formed a pair of parallel, separated fuse receiving openings 143, said openings being coaxial with the fuse receiving portions of each pair of fuse clips 122 and 123 when the cover is in its closed assembled position. The central portion of fuse carrier member 142 is recessed as indicated at 144 so as to clear the barrier webs 145 and 146 which extend lengthwise of base block 124 between the two sets of fuse clips.

The outer end of cover member 125 has formed integrally therewith a pintle member 147 which is adapted to be received in a half round bearing groove 148 formed in the upper surface of the outer end wall 140 of base block 124. The adjacent edge of cover member 125 intermediate the ends of pintle member 147 is cut away as indicated at 149 to provide an opening in which may be received the hook-like upper end 150 of hinge-forming member 126 which thereby engages the upper surface of the pintle member 147 to complete the bearing therefor and to hold the same in the half round bearing groove 148. The intermediate or body portion of hinge-forming member 126 extends downwardly in contact with the outer end wall 140 of base block 124 to a position below the bottom wall 127 and is provided at its lower end with an inwardly extending projection 151 which engages the under surface of said bottom wall and locks the cover member 125 in hinged relationship with base block 124 when the unit is assembled, movement of the projection 151 out of locking engagement with the bottom of the base block being prevented by reason of the fact that, when the fuse unit is placed in the recess 86 of the base block unit of the panel board section, the intermediate or body

portion of hinge-forming member 126 lies practically in contact with the inner surface of the end wall 83, as indicated in Fig. 6.

To facilitate the opening of cover member 125, the outer surface of the latter is preferably provided with a suitable recess 152 in which is housed a pull ring 153 of substantially U-shape, the ends of the ring being turned outwardly and engaging in openings 154 extending through cover member 125. It will be understood that the ends of the pull ring 153 are inserted in openings 154 by first pressing them toward one another and then permitting the resiliency of the ring to expand them into said openings.

The cover member 125 may also be provided on its under surface with a pair of abutment members 155 against which the ends of the fuses 141 are adapted to rest as shown in Figs. 6 and 15, said abutments being so located that when the fuses are in engagement therewith they are properly positioned with respect to the fuse clips. Since these abutment members are at the ends of the fuses remote from the hinged edge of cover member 125, it will be seen that when the cover is being closed the pressure exerted by fuse clips 123, which are the first to be engaged by the fuses, forces the latter firmly against abutment members 155 and thereby assures proper positioning of the fuses with respect to the fuse clips when the cover is completely closed. On the other hand, when the cover is opened, the fuses are released first from fuse clips 122 and then from fuse clips 123, an action which results in pulling the ends of the fuses free from abutment members 155 and leaving them in readily removable position when the cover is completely opened.

As has already been indicated, the arrangement of bus bar clips, conductor and switch jaw members by which the current is delivered from the bus bars to the branch circuits 53 and 54 with which the cartridge fuses 141 are associated is identical with that previously described in connection with the plug fuse unit 25. Consequently, it is obvious that the two kinds of fuse units are interchangeable one with the other so as to make possible any desired fuse arrangement in each panel board section.

In order to control the opening and closing of the fused circuits of the panel board section above described, there has been provided a novel form of snap acting switch which, while capable of use in other surroundings, is especially adapted for mounting without the use of tools in the base block unit of the present invention. Although the elements of this switch unit are so constructed as to provide either a single double or triple pole switch, as desired, the embodiment illustrated is adapted to serve as a double pole switch for opening and closing the two fused branch circuits at either end of the panel board section of the present invention.

As shown best in Fig. 13, the switch unit comprises a pair of parallel, elongated bearing members 156 having aligned bearing studs 157 projecting inwardly therefrom on which is pivotally mounted a switch arm 158 consisting of a pair of parallel side pieces 159 each having at one edge an inwardly turned flange 160, said flanges being connected together at one end of the arm 158 by a web 161 at a point near to, but spaced from, the other end of the arm by a second web 162, the pivotal axis of said arm being located intermediate said webs. The bearing members 156 are also provided with aligned openings 163

adapted to receive a pin 164 which forms the pivot for a substantially L-shaped switch lever 165. As shown, one arm 166 of switch lever 165 is provided intermediate its ends with an eye 167 through which pin 164 passes, the free outer end of said arm being adapted to receive a removable, molded switch handle 168 of suitable non-conducting material. The other arm 169 of switch lever 165 extends through the opening defined by side pieces 159 and webs 161 and 162 of switch arm 158 and is adapted to have detachably connected to its end one end of a spring 170 the other end of which is similarly detachably connectable to web 161, thereby resiliently connecting switch arm 158 and switch lever 165.

At the end of switch arm 158 opposite that to which the spring 170 is connected, the side pieces 159 and flanges 160 are cut in such a way as to form a pair of tongues 171 which, before assembly of the switch, are bent outwardly as indicated in Fig. 13. The switch assembly is completed by a switch bar 172 molded in one piece of non-conducting material which is adapted to be mounted on the last mentioned end of switch arm 158 by means of a substantially T-shaped lug 173 formed integrally therewith. This lug 173 is so constructed as to slide into the space between the side pieces 159 of the switch arm, with the inwardly turned flanges 160 engaging the under surface of the head of the T, and come to rest against the connecting web 162. The tongues 171 may then be pressed inwardly toward one another into a groove 174 formed in the outer edge face of switch bar 172 as indicated in Fig. 7, in which position said tongues prevent the switch bar from moving outwardly out of its proper assembled relationship with the switch arm 158. Switch bar 172 also has formed integrally therewith three spaced, outwardly projecting stub members 175 to each of which may be removably secured, as by a split cotter pin 176, a switch contact member 177 suitably shaped to frictionally engage between and close the circuit across a switch jaw 105 or 105' and its complementary switch jaw 106 or 106', said switch jaws being mounted as previously described in spaced apart relationship in the channels 92 and 94 of the base block unit 25.

In order that the switch unit just described may be used as a single pole switch as well as a triple or double pole switch, the switch bar 172 is so constructed that the two end portions thereof carrying the two outer switch contact members 177 may be broken off from the central portion leaving the latter with only a single switch contact member. For this purpose, the switch bar 172 may be weakened at points intermediate the switch contact members as by molding into the same scoring lines like those indicated at 178.

When using the switch unit as a double pole switch to control the opening and closing of a pair of fused circuits of the character illustrated in the drawings, the elements of the switch, with the exception of pivot pin 164 and switch handle 168, are assembled together in the manner previously described and the unit is inserted through the open bottom of the base block unit 25 in the middle channel 93 thereof between partition walls 89 and 90, it being understood that the center knock-out portion 95 of top wall 84 has already been removed so that the free end of arm 166 of the switch lever 165 may project therethrough. In order to properly po-

sition the switch unit, the adjacent surfaces of partition walls 89 and 90 are provided with grooves 179 of suitable width and depth to receive switch bearing members 156, said grooves 5 extending from top wall 84 to the lowermost portions of semicircular extensions 91. When the switch unit has thus been placed in channel 93 with the switch bearing members in grooves 179, the pivot pin 164 is passed through the 10 aligned openings 163 of bearing members 156 and the eye 167 of the switch bar 165 by inserting the pin through one or the other of a pair of slots 180 formed in the top edges of side walls 82 of the base block unit 25, partition walls 89 15 and 90 also having openings 181 therein in line with slots 180 to receive said pin. As shown best in Fig. 10, the pivot pin 164 is only slightly shorter than the width of the base block unit and, when in its finally assembled position, lies with its extremities in slots 180. The switch 20 handle 168 may then be slid over the outer end of arm 166 of switch lever 165 and the switch is ready for use.

The shape of switch lever 165 and the location 25 of its pivot relative to the pivot of switch arm 158 are such that movement of the switch lever about its pivot moves the switch arm with a snap action in both directions. As shown in Fig. 6, the end of arm 169 of switch lever 165 30 to which the spring 170 is connected is, in spite of the off-set L-shape of said lever, in line with pivot pin 164 and the free end of arm 166. With this construction, and with the pivot pin 164 spaced as illustrated from the bearing studs 157 upon which switch arm 158 is pivoted, movement 35 of switch handle 168 moves the inner end of arm 159 from one side to the other of switch arm 158 so as to reverse the direction of pull of spring 170 on said switch arm relative to its 40 pivotal axis on studs 157. This results in a snap action of the switch arm in both directions, the L-shape of switch lever 165 and the open frame construction of switch arm 158 making it possible for this movement to take place without 45 interference between these two elements.

If it be desired to use the switch unit of the present invention as a single pole switch, the two end portions of switch bar 172 and their associated stud members 175 and switch contact members 177 may be broken off from the central 50 portion and the unit mounted in one or the other of the outer channels 92 and 94 of base block unit 25 in a manner similar to that just described. To accommodate and properly position the bearing members 156 of the switch when thus installed, the outer surfaces of partition walls 89 55 and 90 are provided with grooves 182 similar to the grooves 179 previously mentioned, while the inner surfaces of side walls 82 of the base block unit are provided with ribs 183 which serve to establish similar grooves 184. When single pole switches are used, it is obvious that each of the fused branch circuits is individually controllable. The switch unit is also capable of use as a triple 65 pole switch, although there would be very few instances where this would be required in a panel board of the usual construction since three phase branch circuits are very rarely needed in this type of installation. However, if necessary, the 70 switch unit of the present invention could so function either with a few minor changes in the conductor and switch jaw arrangement disclosed, or in some other environment.

75 There is thus provided by the present inven-

tion a new and improved panel board system comprising a number of different elements which are so designed as to cooperate with one another in the building up of panel boards of any desired size and circuit arrangement. The elements of 5 the system are themselves of novel construction and adapted for mass production at relatively low cost so that substantial stocks thereof may be economically carried by distributors and whole- 10 salers throughout the country, thereby making it possible for an electrical contractor to obtain without special order all of the elements necessary to build up a panel board of any desired design. The elements are also of such construction that they may be quickly and easily assembled with 15 a minimum use of tools. Another important feature of the invention resides in the fact that there have been provided fuse units of both the plug and cartridge type which are interchangeable one with the other in panel board sections 20 or branch circuit units also of novel construction.

Although only one specific example of panel board assembly embodying the present invention has been described and illustrated in the draw- 25 ings, it will be obvious that the invention is not limited to the particular apparatus shown but is capable of a variety of mechanical embodiments. For instance, the construction of each of the various units of the system specifically disclosed 30 may be varied in minor respects and by substituting equivalent elements for those illustrated, particularly as regards the metallic elements forming the current conducting circuits and the switch mechanism. It will also be clear that 35 certain of the elements of the system illustrated, although particularly well adapted for use in combination with the other elements shown, are nevertheless capable of use in other surroundings. Various other changes, which will now be- 40 come apparent to those skilled in the art, may be made in the form, details of construction and arrangement of the parts without departing from the spirit of the invention. Reference is there- 45 fore to be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In a panel board assembly, a cabinet, at least one panel board section removably mounted 50 in said cabinet in a horizontally extending position, a pair of bus bars vertically disposed in said cabinet and extending above and below said panel board section, means carried by said panel board section for frictionally engaging and making 55 electrical connection with said bus bars, a terminal block removably mounted in said cabinet above and supported on said panel board section and adapted to support the upper ends of said bus bars, and a block of insulating material for supporting the lower ends of said bus 60 bars, said last named block extending below and having a detachable connection with said panel board section and being otherwise unconnected to said cabinet.

2. A panel board section of the built-up type 65 comprising a base block unit molded in one piece of non-conducting material and having side walls, end walls, an open bottom, a top wall terminating short of said end walls so as to form a pair of like recesses of substantial size 70 adjacent the unit ends and a pair of supporting platforms positioned in a plane intermediate the planes of the top wall and bottom of the unit and forming the bottoms of said recesses, interchangeable fuse receiving units housed in said 75

recesses and removably secured to said platforms, bus bar clips removably secured to said platforms in insulated relation with respect to said fuse receiving units, conductor and switch jaw members in electrical connection with said fuse receiving units, complementary conductor and switch jaw members in electrical connection with said bus bar clips, and switch means removably mounted in the central portion of said base block unit beneath said top wall for opening and closing the circuits across said switch jaw and complementary switch jaw members.

3. A panel board section of the built-up type comprising a base block unit molded in one piece of non-conducting material and having side walls, end walls, an open bottom, a top wall terminating short of said end walls so as to form a pair of like recesses of substantial size adjacent the unit ends and a pair of supporting platforms positioned in a plane intermediate the planes of the top wall and bottom of the unit and forming the bottoms of said recesses, interchangeable fuse receiving units housed in said recesses and removably secured to the upper sides of said platforms, bus bar clips removably secured to the under sides of said platforms in insulated relation with respect to said fuse receiving units, conductor and switch jaw members secured to the under sides of said platforms in electrical connection with said fuse receiving units, complementary conductor and switch jaw members also secured to the under sides of said platforms in electrical connection with said bus bar clips, and switch means removably mounted in the central portion of said base block unit beneath said top wall for opening and closing the circuits across said switch jaw and complementary switch jaw members, the operating elements of said switch means extending outwardly through openings in said top wall.

4. A cabinet unit for housing the sections of a panel board assembly of the built-up type comprising a sheet metal body member having a flat rear wall and a pair of side walls extending forwardly therefrom, said member being open at the front and at both top and bottom, a cover for the open top end of said body member, cooperating means carried by said body member and cover for detachably securing the same together in assembled relation, a second cover for the open bottom end of said body member, cooperating means carried by said body member and second cover for detachably securing the same together in assembled relation, a member fixed to said rear wall adjacent one side thereof and extending substantially the entire height thereof for engaging and retaining one end of each of the panel board sections, and a second member of like extent carried by said rear wall adjacent the other side thereof for engaging and retaining the other end of each of the panel board sections, said second member being movable relatively to said rear wall toward and away from said first mentioned member to permit the insertion of said panel board sections therebetween.

5. A cabinet unit for housing the sections of a panel board assembly of the built-up type comprising a sheet metal body member having a flat rear wall and a pair of side walls extending forwardly therefrom, said member being open at the front and at both top and bottom, a cover for the open top end of said body member, cooperating means carried by said body member and cover for detachably securing the same to-

gether in assembled relation, a second cover for the open bottom end of said body member, cooperating means carried by said body member and second cover for detachably securing the same together in assembled relation, a member fixed to said rear wall adjacent one side thereof and extending substantially the entire height thereof for engaging and retaining one end of each of the panel board sections, a second member of like extent carried by said rear wall adjacent the other side thereof for engaging and retaining the other end of each of the panel board sections, said second member being movable relatively to said rear wall toward and away from said first mentioned member to permit the insertion of said panel board sections therebetween, and means for limiting the downward movement of the lowermost panel board section housed in said cabinet unit.

6. A cabinet unit for housing the sections of a panel board assembly of the built-up type comprising a sheet metal body member having a flat rear wall and a pair of side walls extending forwardly therefrom, said member being open at the front and at both top and bottom, a cover for the open top end of said body member, cooperating means carried by said body member and cover for detachably securing the same together in assembled relation, a second cover for the open bottom end of said body member, cooperating means carried by said body member and second cover for detachably securing the same together in assembled relation, a member fixed to said rear wall adjacent one side thereof and extending substantially the entire height thereof for engaging and retaining one end of each of the panel board sections, a second member of like extent carried by said rear wall adjacent the other side thereof for engaging and retaining the other end of each of the panel board sections, said second member being movable relatively to said rear wall toward and away from said first mentioned member to permit the insertion of said panel board sections therebetween, and stop means carried by said body member upon which the lowermost panel board section housed in said cabinet unit is adapted to rest.

7. A cabinet unit for housing the sections of a panel board assembly of the built-up type comprising a sheet metal body member having a flat rear wall and a pair of side walls extending forwardly therefrom, said member being open at the front and at both top and bottom, a cover for the open top end of said body member, cooperating means carried by said body member and cover for detachably securing the same together in assembled relation, a second cover for the open bottom end of said body member, cooperating means carried by said body member and second cover for detachably securing the same together in assembled relation, a member fixed to said rear wall adjacent one side thereof and extending substantially the entire height thereof for engaging and retaining one end of each of the panel board sections, and a second member of like extent carried by said rear wall adjacent the other side thereof for engaging and retaining the other end of each of the panel board sections, said second member being movable relatively to said rear wall toward and away from said first mentioned member to permit the insertion of said panel board sections therebetween, the elements of said cooperating securing means carried by said body member adjacent

the top thereof being complementary to those carried adjacent the bottom thereof whereby a plurality of said body members may be connected together to form a panel board cabinet of any desired size.

8. A base block unit for panel board systems molded in one piece of non-conducting material and comprising a pair of side walls extending the entire length of the unit, a pair of end walls connecting said side walls, a top wall connecting said side walls but of less extent lengthwise of said unit than said side walls, said top wall terminating a substantial distance short of each of said end walls and leaving a pair of openings of equal size in the top of said unit adjacent the ends thereof, a supporting platform beneath each of said openings extending between said side walls and positioned in a plane intermediate the planes of the top wall and bottom edges of the side walls, and at least one partition wall extending lengthwise of said unit between said platforms, the bottom of said unit being open and the interior thereof being divided by said platforms and partition wall or walls into spaces in which fuse receiving and switch elements are adapted to be removably housed.

9. A base block unit for panel board systems molded in one piece of non-conducting material and comprising a pair of side walls extending the entire length of the unit, a pair of end walls connecting said side walls, a top wall connecting said side walls but of less extent lengthwise of said unit than said side walls, said top wall terminating a substantial distance short of each of said end walls and leaving a pair of openings of equal size in the top of said unit adjacent the ends thereof, a supporting platform beneath each of said openings extending between said side walls and positioned in a plane intermediate the planes of the top wall and bottom edges of the side walls, at least one partition wall extending lengthwise of said unit between said platforms, the bottom of said unit being open and the interior thereof being divided by said platforms and partition wall or walls into spaces in which fuse receiving and switch elements are adapted to be removably housed, and a plurality of knock-out portions formed in said top wall adapted to provide openings through which the switch operating elements may extend.

10. A base block unit for panel board systems molded in one piece of non-conducting material and comprising a pair of side walls extending the entire length of the unit, a pair of end walls connecting said side walls, a top wall connecting said side walls but of less extent lengthwise of said unit than said side walls, said top wall terminating a substantial distance short of each of said end walls and leaving a pair of openings of equal size in the top of said unit adjacent the ends thereof, a supporting platform beneath each of said openings extending between said side walls and positioned in a plane intermediate the planes of the top wall and bottom edges of the side walls, and at least one partition wall extending lengthwise of said unit between said platforms, said partition wall or walls also being connected to said top wall but of less height than said side walls, the bottom of said unit being open and the interior thereof being divided by said platforms and partition wall or walls into spaces in which fuse receiving and switch elements are adapted to be removably housed.

11. A base block unit for panel board systems

molded in one piece of non-conducting material and comprising a pair of side walls extending the entire length of the unit, a pair of end walls connecting said side walls, a ledge projecting outwardly from the bottom portion of each of said end walls, a top wall connecting said side walls but of less extent lengthwise of said unit than said side walls, said top wall terminating a substantial distance short of each of said end walls and leaving a pair of openings of equal size in the top of said unit adjacent the ends thereof, a supporting platform beneath each of said openings extending between said side walls and positioned in a plane intermediate the planes of the top wall and bottom edges of the side walls, and at least one partition wall extending lengthwise of said unit between said platforms, the bottom of said unit being open and the interior thereof being divided by said platforms and partition wall or walls into spaces in which fuse receiving and switch elements are adapted to be removably housed.

12. A base block unit for panel board systems molded in one piece of non-conducting material and comprising a pair of side walls extending the entire length of the unit, a pair of end walls connecting said side walls, a top wall connecting said side walls but of less extent lengthwise of said unit than said side walls, said top wall terminating a substantial distance short of each of said end walls and leaving a pair of openings of equal size in the top of said unit adjacent the ends thereof, a supporting platform beneath each of said openings extending between said side walls and positioned in a plane intermediate the planes of the top wall and bottom edges of the side walls, a pair of parallel partition walls extending lengthwise of said unit between said platforms, said partition walls being connected to said top wall but of less height than said side walls, the bottom of said unit being open and the interior thereof being divided by said platforms and partition walls into spaces in which fuse receiving and switch elements are adapted to be removably housed, vertical grooves formed in the inner surfaces of said side walls and in both surfaces of each of said partition walls to receive certain of said switch elements, and a plurality of knock-out portions formed in said top wall in the same transverse planes as said vertical grooves and overlying the spaces between said side walls and partition walls, said knock-out portions being adapted to provide openings in the top of the unit through which the switch operating elements may extend.

13. A fuse receiving unit for use in a panel board section of the built-up type comprising a base block, a pair of cartridge fuse clips removably mounted on said base block, a cover for said block including a fuse carrier secured to the under side thereof and adapted to receive a cartridge fuse, a pintle member carried by said cover adjacent one edge thereof, a bearing for said pintle member formed in said base block, and a hinge-forming member adapted to engage said pintle member and retain the same in said bearing when said fuse receiving unit is assembled.

14. A fuse receiving unit for use in a panel board section of the built-up type comprising a base block, a pair of cartridge fuse clips removably mounted on said base block, a cover for said block including a fuse carrier secured to the under side thereof and adapted to receive a cartridge fuse, an abutment member also se-

cured to the under side of said cover against which one end of the fuse is adapted to rest, said abutment member being so located that the fuse is properly positioned with respect to said fuse clips when it is in engagement with said abutment member, a pintle member carried by said cover adjacent one edge thereof, a bearing for said pintle member formed in said base block, and a hinge-forming member adapted to engage said pintle member and retain the same in said bearing when said fuse receiving unit is assembled.

15. A fuse receiving unit for use in a panel board section of the built-up type comprising a base block, a pair of cartridge fuse clips removably mounted on said base block, a cover for said block including a fuse carrier secured to the under side thereof and adapted to receive a cartridge fuse, a pintle member carried by said cover adjacent one edge thereof, a bearing for the under surface of said pintle member formed in said base block, and a hinge-forming member having a hook-like portion adapted to engage the upper surface of said pintle member to complete the bearing therefor and another portion adapted to engage the under surface of said base block and maintain the latter and said cover in hinged relationship when said fuse receiving unit is assembled.

16. In a panel board section of the built-up type, a base block unit having a recess formed in the top thereof adjacent one of its ends, said recess being bounded on one side by the end wall of said unit and on the bottom by a supporting platform, and a fuse receiving unit adapted to be removably housed in said recess comprising a base block adapted to be supported on said platform, a pair of cartridge fuse clips removably mounted on said base block, a cover for said base block including a fuse carrier secured to the under side thereof and adapted to receive a cartridge fuse, a pintle member carried by said cover adjacent the edge thereof lying parallel with and nearest to the end wall of said base block unit, a bearing for the under surface of said pintle member formed in said base block, and a hinge-forming member having a hook-like upper end adapted to engage the upper surface of said pintle member to complete the bearing therefor and an inwardly extending projection formed on its lower end adapted to engage the under surface of said base block and lock the elements of the fuse receiving unit in hinged relationship when said unit is assembled, movement of said projection out of locking engagement with said block being prevented by contact between the intermediate portion of said hinge-forming member and the inner surface of the end wall of said base block unit.

17. A switch unit for use in a panel board section of the built-up type comprising a pair of parallel bearing members, a switch arm pivotally mounted on and between said bearing members at a point intermediate its ends, a pivot pin supported by and extending between said bearing members, a substantially L-shaped switch lever mounted on said pivot pin at a point intermediate the ends of one of its arms, a spring connecting

the free end of the other arm of said lever and one end of said switch arm, a switch bar mounted on the other end of said switch arm and extending transversely thereto, and a plurality of switch contact members mounted on said switch bar.

18. A switch unit for use in a panel board section of the built-up type comprising a pair of parallel bearing members having aligned bearing studs projecting inwardly therefrom, a switch arm pivotally mounted on said bearing studs at a point intermediate its ends, a pivot pin extending between said bearing members and passing through aligned openings formed therein, a substantially L-shaped lever having an eye formed at a point intermediate the ends of one of its arms through which said pivot pin passes, a spring detachably connected to the free end of the other arm of said lever and to one end of said switch arm, a switch bar removably mounted on the other end of said switch arm and extending transversely thereto, and a plurality of switch contact members removably mounted on said switch bar.

19. A switch unit for use in a panel board section of the built-up type comprising a pair of parallel bearing members, a switch arm pivotally mounted on and between said bearing members at a point intermediate its ends, a pivot pin supported by and extending between said bearing members, a substantially L-shaped switch lever mounted on said pivot pin at a point intermediate the ends of one of its arms, a spring connecting the free end of the other arm of said lever and one end of said switch arm, a switch bar mounted on the other end of said switch arm and extending transversely thereto on both sides thereof, and a plurality of switch contact members mounted on said switch bar at spaced intervals therealong, the material of said switch bar being weakened at points intermediate said switch contact members to permit ready removal of one or more portions of said bar and the associated contact members.

20. A panel board section of the built-up type comprising a base block unit molded in one piece of non-conducting material and having side walls, end walls, an open bottom, a top wall wherein there are formed a plurality of fuse receiving recesses of substantial size adjacent the unit ends and supporting platforms positioned in a plane intermediate the planes of the top wall and bottom of the unit and forming the bottoms of said recesses, fuse receiving units removably housed in said recesses and supported on said platforms, bus bar clips removably secured to the under sides of said platforms in insulated relation with respect to said fuse receiving units, switch jaw members in electrical connection with said fuse receiving units, complementary switch jaw members in electrical connection with said bus bar clips, and switch means removably mounted in the central portion of said base block unit beneath said top wall for opening and closing the circuits across said switch jaw and complementary switch jaw members.

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