United States Patent [19]

Schurr

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[45] **July 2, 1974**

[54] **MOUNTING BRACKET FOR ELECTRICAL TERMINAL BLOCK DEVICES**

[76] Inventor: **C. Allan Schurr,** 19805 Scottsdale, Shaker Heights, Ohio 44122

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[52] **U.S. Cl.** ..... **248/223,** 200/168 B, 317/119, 339/198 G

[51] **Int. Cl.** **H01h 9/08**

[58] **Field of Search** ..... 200/168 R, 168 B, 168 C; 317/119, 118; 339/198 R, 198 N, 198 G; 248/223, 225

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Primary Examiner—J. V. Truhe
Assistant Examiner—William J. Smith
Attorney, Agent, or Firm—Harold J. Rathbun et al.

[57] **ABSTRACT**

A mounting bracket holds one or more standard electrical terminal block devices for mounting on a wall or panel without requiring use of a mounting or terminal strip. Cooperating handle lock-off means may be used for locking a terminal block knife switch in its open position.

2 Claims, 8 Drawing Figures

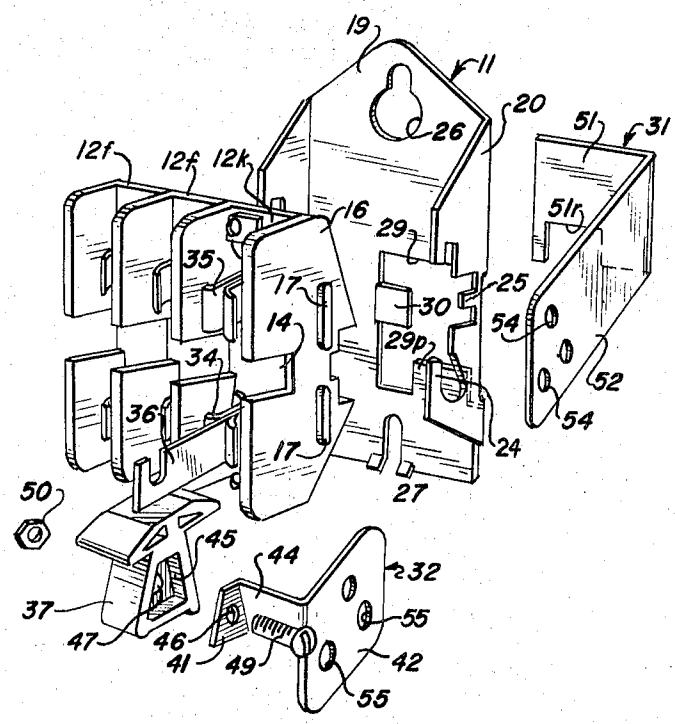


FIG. 1

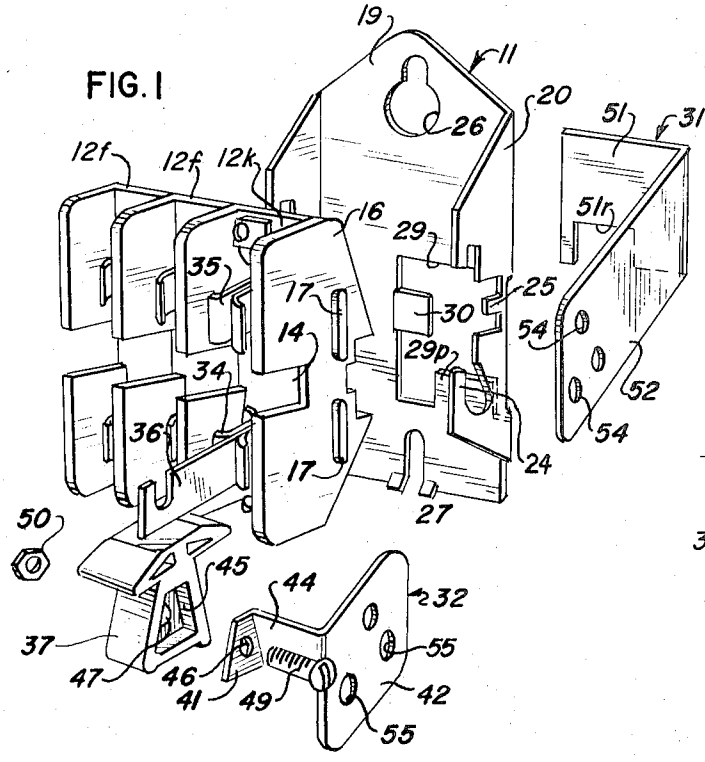


FIG. 2

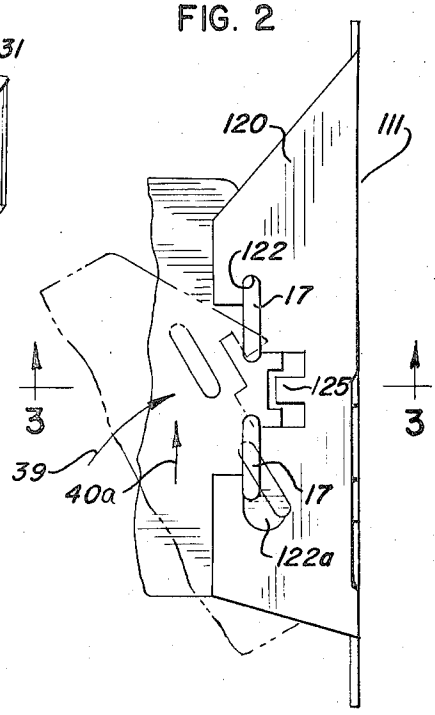


FIG. 3

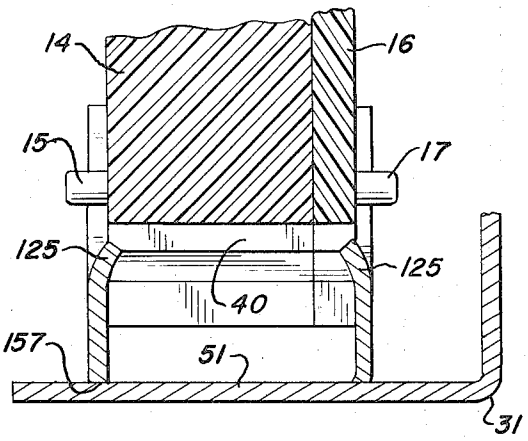


FIG. 4

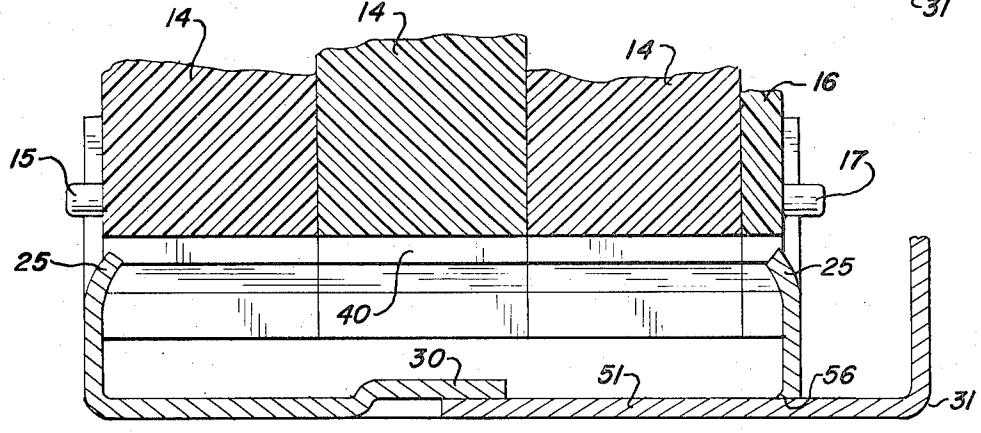


FIG. 5

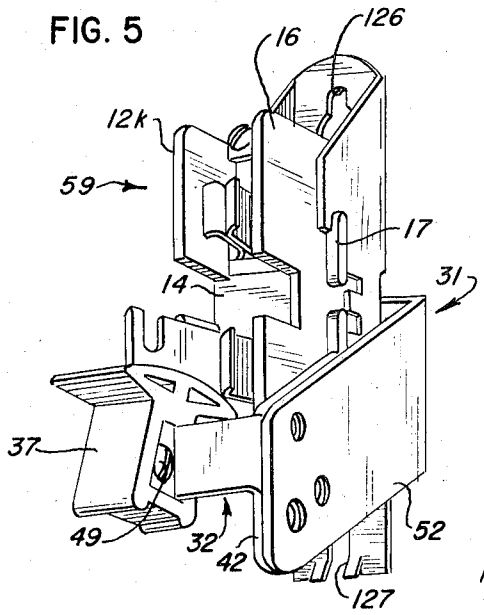


FIG. 6

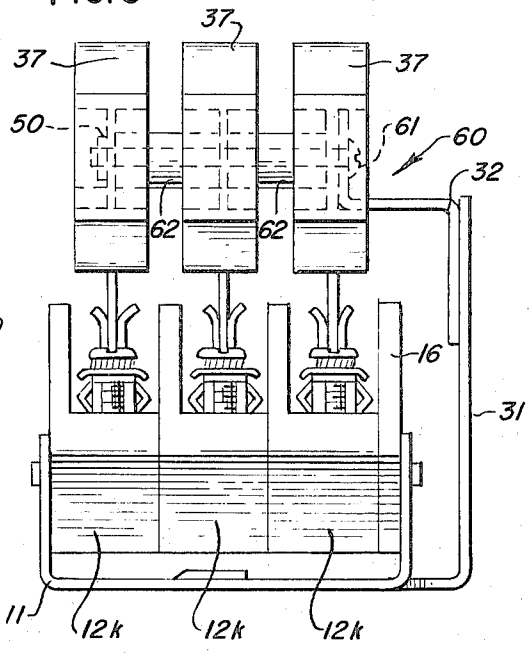


FIG. 7

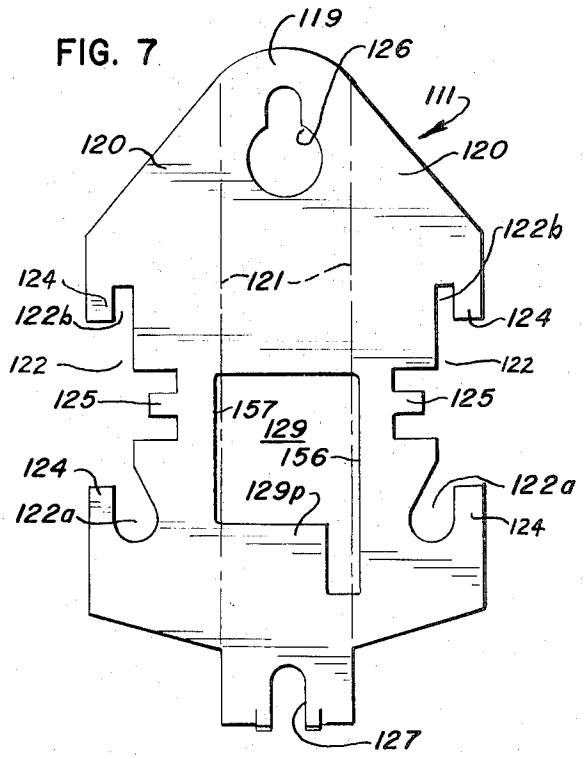
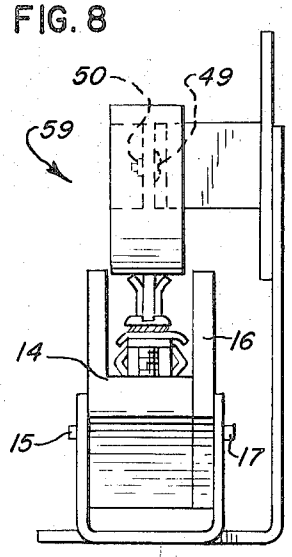


FIG. 8



MOUNTING BRACKET FOR ELECTRICAL TERMINAL BLOCK DEVICES

It is well known to use terminal block devices for terminal connection of panel mounted electrical equipment. Various terminal block devices may be mounted as desired on a mounting or terminal strip which is in turn affixed to the panel. Such a terminal strip and its associated terminal blocks are disclosed in U.S. Pat. No. 2,981,922, issued to Hermon L. Van Valkenburg and Erik J. Nielsen on Apr. 25, 1961, and have great versatility in that many varieties of terminal block devices can be mounted on the terminal strip. One of these is a terminal block knife switch as disclosed in my U.S. Pat. No. 3,624,333, issued on Nov. 30, 1971.

It is often desirable to mount a one-, two- or three-pole knife switch on a wall or panelboard to serve, for example, as a control circuit disconnect switch. It is generally desirable to mount such a switch separately from any terminal strip which may be used in conjunction with the equipment. One-, two- and three-pole knife switches are commercially available and generally used for this purpose. However, they are relatively expensive and not readily interchangeable so that complete stocks must be maintained for each variety of switch. Also, if the switch must be fusible or capable of being locked in the open position, additional expense and stocking problems result.

The mounting bracket of this invention eliminates these and other problems by providing an inexpensive, simple and efficient means for mounting a one-, two- or three-pole knife switch, fusible or unfused, and with or without locking capabilities, through the use of a small number of parts.

It is an object of this invention to provide a mounting bracket for terminal block devices which allows a small number of terminal blocks to be securely mounted on a wall or panelboard without the use of a terminal strip.

It is another object of this invention to provide a mounting bracket which permits assembly and mounting of one-, two- and three-pole knife switches without requiring stocking of a large number of expensive components.

It is a further object of this invention to provide a mounting bracket including means for adapting a one-, two- or three-pole knife switch assembled therein to be locked in the open position.

It is a still further object of this invention to provide a mounting bracket which permits assembly and mounting of knife switches which may be one-, two- or three-pole, may be fusible or unfused, and may be adapted for locking in the open position while requiring stocking of only a small inventory of relatively inexpensive components.

These and other objects and advantages of the present invention will become apparent from the following description when read in conjunction with the accompanying drawings, in which:

FIG. 1 is an exploded perspective view of a plurality of terminal blocks with a mounting bracket and knife switch locking means in accordance with this invention;

FIG. 2 is a fragmentary side view of a terminal block and a mounting bracket illustrating assembly thereof;

FIG. 3 is a fragmentary cross sectional view taken generally along the line 3—3 of FIG. 2;

FIG. 4 is a cross sectional view similar to FIG. 3 of a multi-pole mounting bracket holding a plurality of terminal blocks;

FIG. 5 is a perspective view of a single-pole knife switch assembly in accordance with this invention and shown in its open position;

FIG. 6 is an end view of a three-pole knife switch assembly in accordance with this invention;

FIG. 7 is a plan view of a punched blank which may be bent to form a single-pole mounting bracket in accordance with this invention; and

FIG. 8 is an end view of the single-pole knife switch of FIG. 5 shown in its closed position.

Referring now to the drawings, FIG. 1 illustrates a three-pole mounting bracket 11, in accordance with this invention, adapted for holding a plurality of terminal block devices. The terminal block devices may be of various types, such as a fusible terminal block device 12f illustrated in detail in U.S. Pat. No. 3,302,160, issued on Jan. 31, 1967, to Erik J. Nielsen, and a terminal block knife switch 12k, as disclosed in my above-identified U.S. Pat. No. 3,624,333.

Both the fusible terminal block device 12f and the terminal block knife switch 12k are formed by assembling appropriate components in a standard terminal block 14. The terminal block 14 is described in the above-mentioned U.S. Pat. No. 3,302,160 and is preferably constructed of a molded phenolic material. Each terminal block 14 is generally L-shaped and has a pair of horizontally elongated, generally rectangular projections 15 (FIG. 3) formed in one side thereof and a pair of recesses (not shown) shaped and positioned to receive the respective projections 15 of the adjacent terminal block 14 on the other side thereof. An end barrier 16 has a pair of projections 17, similar to the projections 15 on the terminal block 14, formed on each side thereof. The end barrier 16 is used so that projections 15 and 17, respectively, will be located at opposite sides of the terminal block devices to facilitate mounting in the bracket 11, as will be subsequently explained.

Each mounting bracket, either in the form of a three-pole mounting bracket 11 or a single-pole mounting bracket 111, is preferably stamped from a piece of sheet metal such as illustrated in FIG. 7 for a single-pole mounting bracket 111. The single-pole mounting bracket 111 has a base or bight portion 119 and a pair of side walls 120 which extend in a direction generally perpendicular to the bight portion 119 when the mounting bracket is bent at the fold lines indicated at 121. Each side wall 120 has a projection holding slot 122 formed therein. Each slot 122 has an enlarged end portion 122a and a narrow end portion 122b to accommodate mounting of the terminal block device 12 in a manner to be described. Entrance channels are provided in each side wall 120, each channel being defined by a pair of end tabs 124 and positioned outwardly of its respective slot 122. An outwardly directled locking tab 125 is positioned inwardly of each slot 122.

The bight portion 119 includes means for mounting the mounting bracket 111 on a wall or panelboard which means may be in the form of a keyhole aperture 126 and slot 127 to accommodate a pair of screws (not shown). An opening 129 is preferably provided in the bight portion 119 to accommodate mounting of cooperating handle lock-off means used to lock a terminal block knife switch, such as the switch 12k, in its open position.

The three-pole mounting bracket **11**, best illustrated in FIG. **1**, has a pair of side walls **20** substantially identical in form to the side walls of the single-pole mounting bracket **111**. The three-pole mounting bracket **11** differs generally from the single-pole mounting bracket **111** in only two respects. First, the bight portion **19**, corresponding to the bight portion **119** of the single-pole bracket **111**, is of a width to accommodate mounting of three terminal blocks **14** and an end barrier **16**. Second, the bight portion **19** accommodates mounting of cooperating handle lock-off means through an opening **29**, similar in configuration to the opening **129** of the single-pole mounting bracket **111**, but including a holding tab **30** which, as can be seen in FIG. **4**, is parallel to and offset from the plane of the bight portion **19**. It should be noted that although only a single-pole mounting bracket **111** and a three-pole mounting bracket **11** have been described herein, mounting brackets for holding other quantities of terminal block devices may be made without deviating from the spirit and scope of this invention.

The cooperating handle lock-off means of this invention preferably comprises a fixed handle lock-off member **31** (FIG. **1**) and a movable handle lock-off member **32**.

The cooperating handle lock-off means functions to lock a knife switch, such as the switch **12k**, in its open position. The knife switch **12k**, fully described in my above-mentioned U.S. Pat. No. 3,624,333, is constructed by mounting a pivot receptacle **34** and a contact receptacle **35**, each of which includes a terminal portion, on a terminal block **14**. A switch blade **36** is pivotally attached at one end to the pivot receptacle **34** and has an electrically insulating handle **37** attached at a free end portion. The handle **37** may be used to move the switch blade **36** between its open position, as illustrated in FIG. **1**, nd its closed position, wherein the switch blade **36** is moved into electrical contact with the contact receptacle **35**.

A terminal block device **12**, such as a terminal block knife switch **12*k***, can be assembled with an end barrier **16** to form a unit, as illustrated in FIGS. **5** and **8**, having the pairs of projections **15** and **17** on opposite sides thereof. The combined terminal block and end barrier are mounted on the single-pole mounting bracket **111**, as best shown in FIG. **2**, by inserting one of each pair of projections **15** and **17** through its respective entrance channel between the end tabs **124** and into the enlarged end portion **122*a*** of the projection holding slot **122** to the position shown by phantom lines in FIG. **2**. The terminal block end-barrier assembly is then rotated in the direction of an arrow **39** in FIG. **2** to place both members of each pair of projections **15** and **17** in alignment with the projection holding slot **122**. Moving the terminal block and end barrier in the direction of the arrow **40*a*** to the position shown by solid lines in FIG. **2** prevents removal of the projections **15** and **17** from the respective projection holding slots **122**. The locking tabs **125** may then be bent inwardly, to the position shown in FIG. **3**, into respective grooves **40** formed in the terminal block **14** and end barrier **16**, respectively, to lock the assembly in the mounting bracket **111**.

Mounting of three terminal block devices **12** in a three-pole mounting bracket **11** is accomplished in the same manner described with respect to the single-pole device of FIG. **2**. When locking tabs **25**, corresponding to the locking tabs **125** of the single-pole mounting bracket **111**, are bent inwardly to hold the assembly in place, a configuration such as that illustrated in FIG. **4** is produced.

If it is desired to provide means for locking a terminal block knife switch **12*k*** in its open position, the cooperating handle lock-off means illustrated in FIG. **1** is used. The movable handle lock-off member **32** is preferably formed of metal and comprises a handle attachment portion **41** and a lock-off portion **42**, disposed generally parallel to each other and connected by a spacer portion **44**. The handle attachment portion **41** is preferably shaped to fit a corresponding recess **45** formed in the handle **37** of the terminal block knife switch **12k**. Corresponding openings **46** and **47** in the handle attachment portion **41** and handle **37**, respectively, facilitate attachment of the movable handle lock-off member **32** to the handle **37** by suitable attachment means such as a machine screw **49** and nut **50**.

The fixed handle lock-off member **31** is preferably formed of metal and comprises a base portion **51** and an upstanding lock-off arm **52**. When the knife switch **12k** is in its open position, the lock-off arm **52** is preferably positioned adjacent the lock-off portion **42** of the movable handle lock-off member **32**, as can be best seen in FIG. **5**. One or more lock-receiving openings **54** in the lock-off arm **52** of the fixed handle lock-off member **31** align with a matching set of lock-receiving openings **55** in the lock-off portion **42** of the movable lock-off member **32**. A padlock or other device (not shown) may be inserted through any aligned pair of lock-receiving openings **54–55** to secure the handle **37** and switch blade **36** against motion, thereby locking the terminal block knife switch **12*k*** in its open position.

The base portion **51** of the fixed handle lock-off member **31** is of a shape and size to cooperate with the opening **29** of the three-pole mounting bracket **11** and the opening **129** of the single-pole mounting bracket **111** for securement of the fixed handle lock-off member **31** without the use of external mounting means. The opening **29** in the three-pole mounting bracket **11** has a projection **29*p*** formed therein corresponding in size, shape and location to a recess **51*r*** formed in the base portion **51** of the fixed handle lock-off member **31**. Interaction of the projection **29*p*** and recess **51*r*** prevent lateral movement of the fixed handle lock-off member **31**. The holding tab **30** extends over an extended end portion of the base portion **51** (see also FIG. **4**) and cooperates with an edge **56** of the opening **29** to hold the base portion **51** in place against the mounting surface.

Referring now to FIGS. **3** and **7**, when the side walls **120** of the single-pole mounting bracket **111** are folded along the fold lines **121**, as previously described, a projection **129*p*** is formed having a shape, size and position substantially the same as that of the projection **29*p*** of the three-pole mounting bracket **11** so that the same fixed handle lock-off member **31** may be used with either the three-pole mounting bracket **11** or the single-pole mounting bracket **111**.

The recess **51*r*** interacts with the projection **129*p*** to hold the base portion **51** against lateral motion. The base portion **51** is held against the mounting surface by an edge **156** and an edge **157** of the opening **129**. The opening **129** is so shaped that the edges **156** and **157** are positioned outside the fold lines **121** as part of the respective side walls **120** so that, when the mounting

bracket **111** is bent at the fold lines **121**, the edges **156** and **157** are disposed in positions spaced above the plane of the mounting surface by a distance approximately equal to the thickness of the base portion **51** of the fixed handle lock-off member **31**. The same relationship exists with respect to the edge **56** of the opening **29** in the three-pole mounting bracket **11**. In this manner, the fixed handle lock-off member **31** may be mounted and held in place solely by the mounting bracket with both the base portion **51** of the fixed handle lock-off member **31** and the bight portions **19** and **119** of the mounting bracket **11** or **111**, respectively, flush against the mounting surface.

One-, two- and three-pole knife switches, constructed in accordance with this invention, will now be described. FIGS. **5** and **8** illustrate a single-pole knife switch assembly **59** which is assembled by mounting a terminal block knife switch **12*k*** and an end barrier **16** in a single-pole mounting bracket **111** in the manner previously described with reference to FIG. **2**. The single-pole knife switch assembly **59** may be mounted on any suitable mounting surface by the use of mounting screws through the keyhole aperture **126** and the slot **127** in the bight portion **119** of the mounting bracket **111**.

If the cooperating handle lock-off means is required, the movable handle lock-off member **32** may be affixed to the handle **37** of the terminal block knife switch **12k** and the fixed handle lock-off member **31** positioned with its base between the mounting bracket **111** and the mounting surface to be locked in place upon tightening of the mounting screws.

FIG. **6** illustrates a three-pole knife switch assembly **60** which comprises three terminal block knife switches, such as the switches **12*k***, and an end barrier **16** placed side by side and mounted on the mounting bracket **11** as described with reference to FIGS. **2** and **4**. The handles **37** of the terminal block knife switches **12k** are joined by passing a fastener, such as a machine screw **61**, through the openings **47** in the handles **37** (see FIG. **1**) and through openings provided in spacers **62** positioned between adjacent pairs of handles **37**. A nut **50** is threaded onto the machine screw **61** to lock the handles **37** together so that the three terminal block knife switches **12*k*** can be opened and closed as a unit. If it is desirable to provide the cooperating handle lock-off means, the fixed handle lock-off member **31** may be mounted behind the mounting bracket **11** as previously described and the movable handle lock-off member **32** may be held in place by the machine screw **61**.

It should be apparent from the foregoing description that a two-pole knife switch assembly (not shown) may be formed by assembling two terminal block knife switches **12*k*** with an empty terminal block **14** therebetween. The three terminal blocks **14**, along with an end barrier **16**, are mounted on the three-pole mounting bracket **11** as previously described. The handles **37** may then be joined by a machine screw **61** and nut **50** passed through the handles **37** and an appropriate spacer.

If it is desirable to construct a fusible switch having one, two or three poles, a second mounting bracket **11** or **111** may be mounted in alignment with the knife switch assembly. This mounting bracket should hold a quantity of fusible terminal blocks **12f** equal to the number of poles of the knife switch assembly. The fusible knife switch assembly is then formed by electrically connecting a terminal of each terminal block knife switch **12*k*** to a corresponding terminal of each fusible terminal block **12*f***.

I claim:

1. A mounting bracket for a terminal block device having projection means on opposite sides thereof, said mounting bracket comprising a base, a pair of generally parallel side walls extending in one direction from said base, each of said side walls having projection receiving means formed therein, said projection receiving means including an entrance channel permitting insertion of an end portion of said projection means into said projection receiving means, an enlarged portion permitting rotation of said terminal block device for insertion of an other end portion of said projection means into said projection receiving means, means holding the other end portion of said projection means against rotation when said terminal block is in an operating position away from said enlarged portion, and locking means for securing said terminal block device in said operating position.

2. A mounting bracket as in claim **1** wherein said terminal block device includes a groove and said locking means comprises a locking tab having an extended end portion movable into said groove for securing said terminal block device in said operating position.

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