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3,458,768

ELECTRIC METER-MOUNTING AND FUSE-HOLDER ASSEMBLY

Filed July 17, 1967

3 Sheets-Sheet 1

FIG. 1

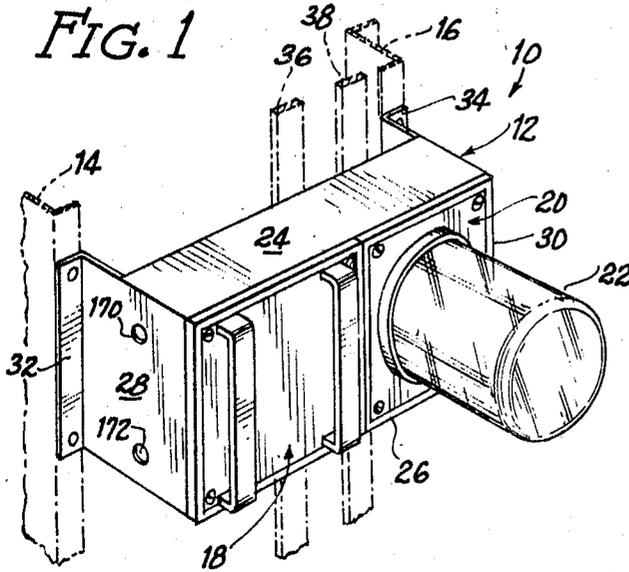


FIG. 2

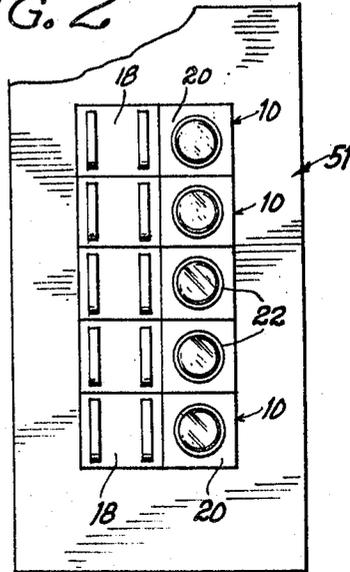


FIG. 3

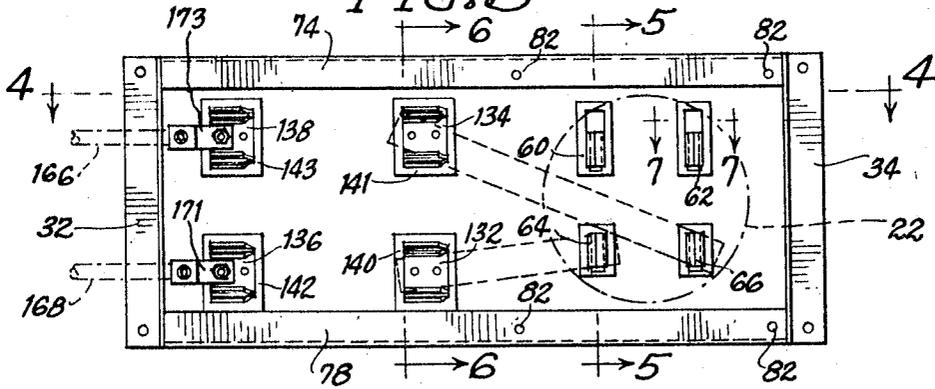
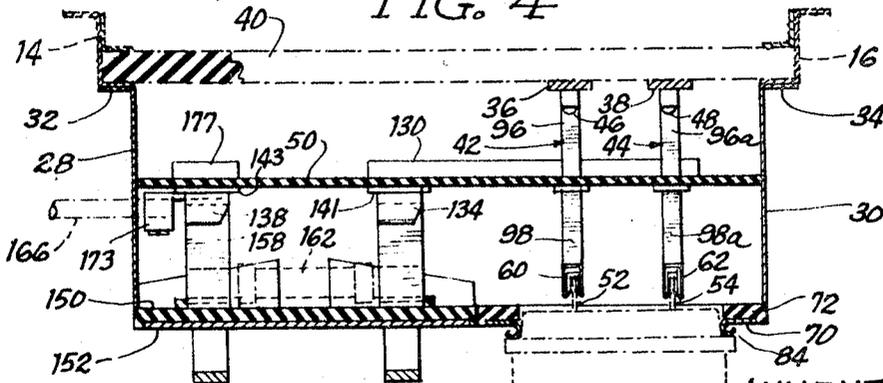


FIG. 4



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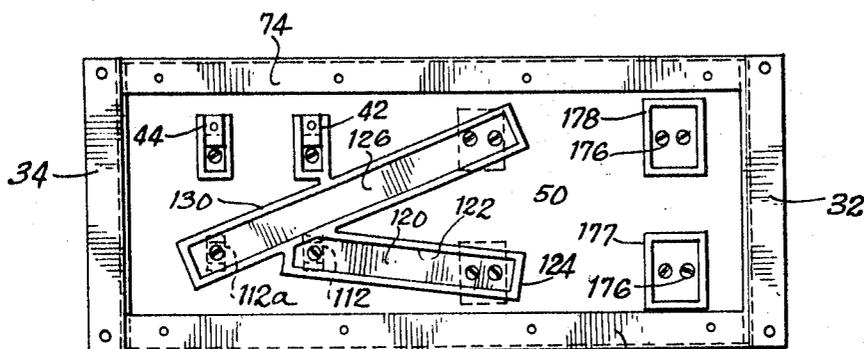
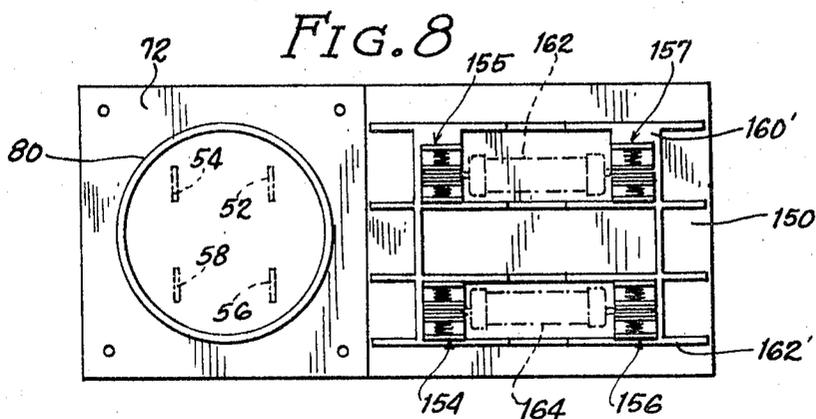
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ELECTRIC METER-MOUNTING AND FUSE-HOLDER ASSEMBLY

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3 Sheets-Sheet 3



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ELECTRIC METER-MOUNTING AND FUSE-HOLDER ASSEMBLY

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11 Claims

ABSTRACT OF THE DISCLOSURE

A unitary housing is adapted to mount a kilowatt-hour meter and contains a combination pull-out switch and fuse-holder assembly. The unit has a modular construction for employment in large numbers in installations requiring a large number of metered branches. Structural features provide economy of construction and installation, as well as safety.

BACKGROUND OF THE INVENTION

Discrete mounting and socket housings for kilowatt-hour meters are of course conventionally employed in installations having only a single metered branch. Typically such housings are installed at the point of entry of the service mains and connected to a suitable discrete fuse and switch assembly, generally located near the meter, by leads running within a conduit or raceway. In installations having a large number of metered branches, as for example in large apartment or office buildings, it has heretofore been the practice to merely employ a correspondingly large number of such discrete elements. For ease and rapidity of reading each meter, the meter-mountings and sockets are desirably grouped closely together, or clustered. Thus the fuse and switch assemblies are necessarily somewhat remotely located therefrom. Therefore, a complete installation of this type, including the necessary network of interconnecting conduits, generally requires considerable space. However, even with the positioning of each fuse and switch assembly adjacent its associated meter, with the loss to some degree of meter reading convenience, the utilization of discrete interconnected housings still produces an installation occupying considerable space and requiring excessive and costly installation time.

SUMMARY OF THE INVENTION

The present invention relates to electrical meter-mounting and fuse-housing assemblies of the type generally provided at the termination of the service mains at a consumer location, and particularly to such assemblies for use in distribution systems having multiple metered branches, such as is generally required in multiple tenant buildings.

It is the principal object of the present invention to provide a meter-mounting and fuse-housing assembly having a compact unitary structure requiring a minimum of space for installation, and constructed prior to installation to provide a modular assembly when employed in multiple branch systems. The assembly also permits ease and convenience of meter readability and fuse access. Furthermore, the modular preassembled construction in accordance with the invention also provides reduced installation costs which are especially significant where a large number of metered branches are required.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel features of construction, arrangement and a combination of parts hereinafter fully described, illustrated in the accompanying drawings, and

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particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

For the purpose of facilitating an understanding of my invention, I have illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, my invention, its mode of construction, assembly and operation, and many of its advantages should be readily understood and appreciated.

Referring to the drawings in which the same characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawings:

FIG. 1 is a pictorial view in perspective, showing a unitary meter-mounting and switchable fuse-housing module in accordance with the present invention;

FIG. 2 is a front view in elevation, showing a plurality of modules of FIG. 1 assembled in a five unit installation;

FIG. 3 is a front view in elevation of the module of FIG. 1, with pull-out switch, meter, and meter-mounting panel removed;

FIG. 4 is a longitudinal sectional view taken along line 4-4 in FIG. 3 in the direction of the arrows, with the pull-out switch and meter-mounting panel in place;

FIG. 5 is a transverse sectional view taken along line 5-5 in FIG. 3 in the direction of the arrows, with the meter-mounting panel in place;

FIG. 6 is a transverse sectional view taken along line 6-6 in FIG. 3 in the direction of the arrows, with the pull-out switch in place;

FIG. 7 is an enlarged detail view of the contact-structure employed in the embodiment of the invention described;

FIG. 8 is a rear view of the front panel in elevation, showing the meter-mounting panel and pull-out switch; and

FIG. 9 is a rear view in elevation of the module of FIG. 1.

Referring now to FIG. 1, a module indicated generally by reference numeral 10 having a metal housing 12, is mounted across uprights 14 and 16. The front panel of the module is formed in two sections; a pull-out switch section 18, including a fuse assembly (which is described below), and a meter section 20 for mounting and connecting a kilowatt-hour meter 22 of a conventional type. The housing 12 is integrally formed in rectangular shape by upper and lower planar sides, 24 and 26, and lateral ends 28 and 30. Lateral ends 28 and 30 each have an integral mounting flange, 32 and 34 respectively, fastened to the uprights 14 and 16 which are of Z-shaped cross-section. Service bus bars 36 and 38 are vertically disposed between the uprights in coplanar relation to the mounting flanges 32 and 34, and are supported by a plurality of horizontal insulators such as 40 (shown in FIG. 4), which are fixed to the uprights by angle clips, or other suitable means. The upper and lower housing sides 24 and 26 are recessed away from the plane of the bus bars to avoid shorting or arcing, and to permit air circulation for cooling. Parallel electrical connectors 42 and 44 protrude rearwardly from the insulator back-panel 50 to electrically connect the module 10 to the bus bars. Mechanically the connection is made by means of screws 46 and 48 which are threaded in tapped holes vertically disposed along the bus bars.

A large number of modules 10 may thus be adjacently and vertically stacked with their upper and lower planar

sides, 24 and 26, abutting one another, as shown in FIG. 2. The uprights 14 and 16, their associated supports (not shown) and bus bars 36 and 38 are all mounted in a suitable cabinet or closet, and a panel board 51 (having an appropriately sized rectangular aperture) is placed thereover for reasons of safety and to prevent the accumulation of dust and dirt therein. This technique of construction permits standard modules to be used in installations having a wide variety of requirements.

Referring now to the detailed construction of the module 10 in accordance with the preferred embodiment of the invention, the kilowatt-hour meter 22 is electrically coupled to the module housing in "plug-in" fashion by means of four female terminals or clips 60, 62, 64 and 66 (shown in FIG. 3) which receive the four corresponding prongs 52, 54, 56 and 58 (shown in FIG. 8) normally found on such conventional meters. The meter 22 is detachably mechanically held in place on a rectangular metal mounting plate recessed into and fastened to a rectangular insulator panel section 72, which in turn is fastened to the internal flanges 74 and 78 of the metal housing 12 (shown in FIGS. 3, 4 and 5). The insulator panel section 72 has a neck portion 80 (FIG. 5) protruding inwardly beyond the flanges which serves both to key the panel section to the housing for ease of assembly and to aid in providing support for the meter; thereby relieving to some degree the vertical stresses on the mounting screws threaded into the four mounting holes 82. The plate 70 is also keyed and supported by its recessed relation to the panel section 72 and has an outwardly curved lip portion 84 which receives the rear end of the meter 22 near its peripheral edge. A circular strap 86 of generally U-shaped cross-section clamps the rim of the meter to the lip 84. The strap 86 is tightened by any suitable means and normally locked in position by an electric utility company seal (not shown).

The four meter connecting terminals 60, 62, 64 and 66, one of which is shown in detail in FIG. 7, each have a pair of integral resilient contact members 88 and 90, and integral spring members 92 and 94, to provide positive electrical contact with the meter prongs. Both the contact and spring members are generally U-shaped and have aligned apertures at their base portions 89 and 91, the base of the spring member being seated within that of the contact member, which in turn is fastened against the end of a conductor-post, as will now be described.

As shown in FIGS. 4 and 5, the electrical connectors 42 and 44 each have a rearwardly extending external portion 96 and 96a, and a forwardly extending internal portion or post 98 and 98a integral therewith and sectionally cut from an extruded length of metal such as aluminum or other extrudable conductor. Thus, these members may be economically manufactured in the shape of connector 42 shown in FIG. 5. Each member has a shoulder portion 100 in abutment against the inner side of the insulator-panel 50, which is apertured to permit the external portion 96 to extend therethrough. The internal or post portion 98 has a longitudinal bore 102 which is aligned with a hole 104 in the panel 50. A bolt 105 is inserted through the hole and bore, and through the aligned apertures in the base portion of the meter-connecting terminal 60, and a nut is threaded on the bolt between the contact and spring members of the terminal to secure it to the end of the post-portion 98. A vertically oriented locking member 106 is provided between the contact and spring members of the terminal 60 (see FIG. 7), having a portion bent rearwardly against the bottom surface of the post-portion 98. The locking member 106 prevents rotation of the terminal 60 about the axis of the bolt. An internally projecting rib 110 which is integral with the panel 50 provides additional support for the connector 42 and rapid alignment of the hole 104 with the bore 102. Electrical connector 44, although not visible in FIG. 5, is constructed and assembled in the manner of connector 42 just described.

Two conductor-posts 112 and 112a (FIG. 9), of rectangular cross-section, are mounted on the panel 50 beneath the post-portions 98 and 98a, and similarly have terminals 64 and 66 respectively secured to the ends thereof by means of a nut and bolt arrangement. The opposite end of the post 112 has a shoulder portion 114 seated against the inside surface of the panel 50 and confined by a rectangular rib 116 corresponding to the cross-section of the post. A neck portion of the post extends through an aperture 118 in the panel and abuts against an elongated flat conductor 120 disposed in a channel 122 formed by external rib 124, which is integral with the panel 50. The conductor 120 is securely retained in the channel by the nut and bolt arrangement shown in FIG. 5, which also retains the terminal 64. The channel 122 is also illustrated in FIG. 9.

The conductor-post 112a is mounted in the same manner as the post 112 just described, and as shown in FIG. 9, is secured in abutment with a second elongated flat conductor 126 by means of a similar nut and bolt arrangement, which also retains the terminal 66 to the opposite end of the post. The flat conductor 126 is likewise disposed in a channel 128 formed by an extended rib 130 also formed integrally with the panel 50.

The opposite ends of the flat conductors 120 and 126 are respectively connected to socket terminals 132 and 134 by screws as shown in FIGS. 3, 6, and 9, the terminals 132 and 134 together with oppositely disposed terminals 136 and 138 being adapted to receive the fuse and pull-out switch-assembly 18 to be hereinafter described. Each of the terminals 132, 134, 136, and 138 is seated within confining ribbings 140, 141, 142 and 143, to provide keying in assembly and to prevent rotation.

The pull-out switch and fuse-mounting assembly 18 is located adjacent the meter section 20 on the front panel, and comprises an insulator panel section 150 having a metal face and handle unit 152 screwed to the front or outer face thereof, as shown best in FIGS. 1, 4 and 6. Fuse clips 154, 155, 156 and 157 of conventional design are fastened in pairs to the internal or back face of the panel section 150 by recessed or embedded screws as shown in FIG. 6, the two pairs of clips being positioned opposite respective socket terminals 132, 134, 136 and 138 as shown by FIGS. 3 and 8. Each of the fuse-clips are identical and a description of only 155 will suffice for all. This clip has a double prong portion 158, fuse-contact portions 159, and a pair of opposing springs 160 and 161 urging the fuse-contact portions together. The fuse-clips are adapted to receive conventional cartridge fuses 162 and 164, indicated in dotted-line, the fuses being nested within rectangular rib structures integral with the insulator-panel section 150 as shown in FIG. 9. Each fuse-clip is securely fitted within the lateral ends of the rectangular rib structures, and as shown in FIG. 6, the upper and lower rib edges 160' and 162' protrude past the upper and lower internal housing flanges 74 and 78 with small clearance. In this position, the prong portions of the clips, 154 through 157 engage their respective socket terminals 132, 134, 136 and 138. The double prong and socket construction of each clip and terminal provides increased current carrying capacity as well as a firmer and rigid coupling, the clip action of each of the terminals 132, 134, 136 and 138 providing the sole horizontal retaining force for the pull-out switch 18.

It should be noted here that the vertical placement of the upper and lower pairs of fuse-clips is off-center with respect to the spacing between the flanges 74 and 78. Thus, due to the keying action of the rib edges 160' and 162', a mating relation between the prongs and terminals is provided only in the position shown. In use, should it be desired to disconnect the service while avoiding exposure of the socket terminals which remain "live," the pull-out switch 18 is removed, inverted and reinserted. The prong portions of the clips will then not mate with the socket

terminal clips, being raised thereover with clearance there-between.

The insulated branch lines 166 and 168 which feed the particular tenant or metered area are inserted through apertures 170 and 172 in the housing side 28, each having suitable insulated bushings (not shown). The bare ends of the lines are each clamped within connecting lugs 171 and 173 which are respectively fastened to terminal sockets 136 and 138. Although not shown, when the modules 10 are installed in a rack, cabinet or closet, the branch leads 166 and 168 are disposed behind a suitable panel 51 and are normally fed to the metered area through suitable conduit.

In a preferred form of the invention, a potting or sealing compound 174 and 175, shown in FIGS. 5 and 6, fills the channels 122 and 128 on the rear surface of the back panel 50 to prevent shock hazard from the flat conductors 120 and 126, and to prevent corrosion thereof. Potting compound also preferably cover the mounting-screw heads 176 which are recessed within rectangular ribbings 177 and 178 which are filled with the compound, so that no "live" conductive parts are exposed, except the bus-bar connectors 42 and 44.

As can be readily seen from the above description and the several views, the required circuit path is provided from the bus bars 36 and 38, through the meter 22, the flat conductors 120 and 126, the cartridge fuses 162 and 164, to the branch lines 166 and 168. The pre-assembled modulus 10 can be easily installed and stacked in large numbers in a relatively small space, each having convenient fuse-access and simple and safe cut-off, while also having features providing economy of construction and economical installation.

Although the embodiment described herein employs a single common housing for both front-panel sections, separate or partitioned housing may alternatively be used having a common back panel which may support the inter-connecting conductors, such as 120 and 126, on the inside rather than the outside surface, although less advantageously.

Many modifications and utilizations of the teachings of the invention will become apparent to persons skilled in the art, some differing considerably in appearance from that described. Accordingly, the scope of the invention should not be limited by the embodiment herein described, but should be defined only by the appended claims, and equivalents thereof.

What I claim and desire to secure by Letters Patent of the United States is:

1. A modular mounting assembly for a meter and fuse-holder comprising:

- (a) a generally planar insulator member,
- (b) first electrical connecting means mounted on the insulator member and extending from one surface thereof for detachable coupling to at least one service bus,
- (c) second electrical connecting means mounted on the insulator member and extending from the other surface thereof for detachable coupling to a meter for measuring the consumption of electrical energy,
- (d) third electrical connecting means mounted on the insulator member and extending from said other surface, including at least one pair of terminals for detachable coupling to a fuse-holder,
- (e) first conductor means rigidly fixed to said insulator panel for electrically interconnecting said first and second connecting means,
- (f) second conductor means rigidly fixed to said insulator panel for electrically interconnecting said second connecting means to one terminal of said pair of terminals, and
- (g) means for mounting said insulator member on a supporting structure so that said first connecting means is positioned adjacent to said service bus for connection thereto.

2. In the assembly of claim 1, housing means rigidly secured to the insulator member and having a pair of spaced apart parallel planar sides normal thereto forming upper and lower walls of the housing, whereby a plurality of said assemblies may be positioned adjacent each other with said planar sides in abutment with one another.

3. The assembly of claim 2 in which said housing means comprise a pair of spaced apart parallel planar sides normal to the insulator member and extending from said other surface thereof in planes normal to said upper and lower walls to form lateral walls of the housing, and means for mechanically fastening the meter to the housing, including a mounting plate disposed parallel to the insulator member and spaced therefrom by at least two of said planar sides, said mounting plate being disposed opposite said second electrical connecting means.

4. The assembly of claim 3 wherein said third electrical connecting means is disposed laterally adjacent to said second electrical connecting means, and defines the location of said fuse-holder adjacent said meter-mounting plate.

5. The assembly of claim 4 wherein said housing means comprises keying surface portions adapted to mate with corresponding portions of the fuse-holder so that electrical contact is made with only said pair of terminals of the third connecting means in one orientation of the holder with respect to the housing.

6. The assembly of claim 1 wherein said first conductor means comprises an elongated rigid metal member having said first and second electrical connecting means disposed on opposite ends thereof and mounted to the insulator member at a portion therebetween, said first connecting means being integral with the metal member and defining a tab portion extending normal to the elongated portion of the metal member and adapted to be secured to said service bus.

7. The assembly of claim 1 wherein said second conductor means comprises a relatively flat rigid metal conductor disposed adjacent said insulator member.

8. The assembly of claim 7 wherein said flat conductor is disposed adjacent said one surface of the insulator member and within a rib structure formed integral with said member.

9. The assembly of claim 8 wherein said flat conductor is potted within said rib structure by means of an insulative sealing compound.

10. The assembly of claim 3 wherein said means for mounting said insulator member on a supporting structure comprises flanges normal to and integral with said lateral housing walls.

11. A meter and fuse mounting installation including a plurality of modular assemblies in accordance with claim 10, and comprising a pair of vertical uprights disposed in parallel spaced apart relationship, each having surfaces fastened mechanically to said flanges so that the assemblies are adjacently stacked, at least one service bus disposed intermediate said uprights and parallel thereto, and being mechanically and electrically connected to said first connecting means associated with each assembly.

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317-114, 116