Sept. 23, 1947. A. J. A. PETERSON ET AL. 2,427,742

SWITCHBOARD CONSTRUCTION HAVING ADJUSTABLE GROMMET WIRE HOLDERS

Filed March 12, 1943 2 Sheets-Sheet 1

Fig. 1.

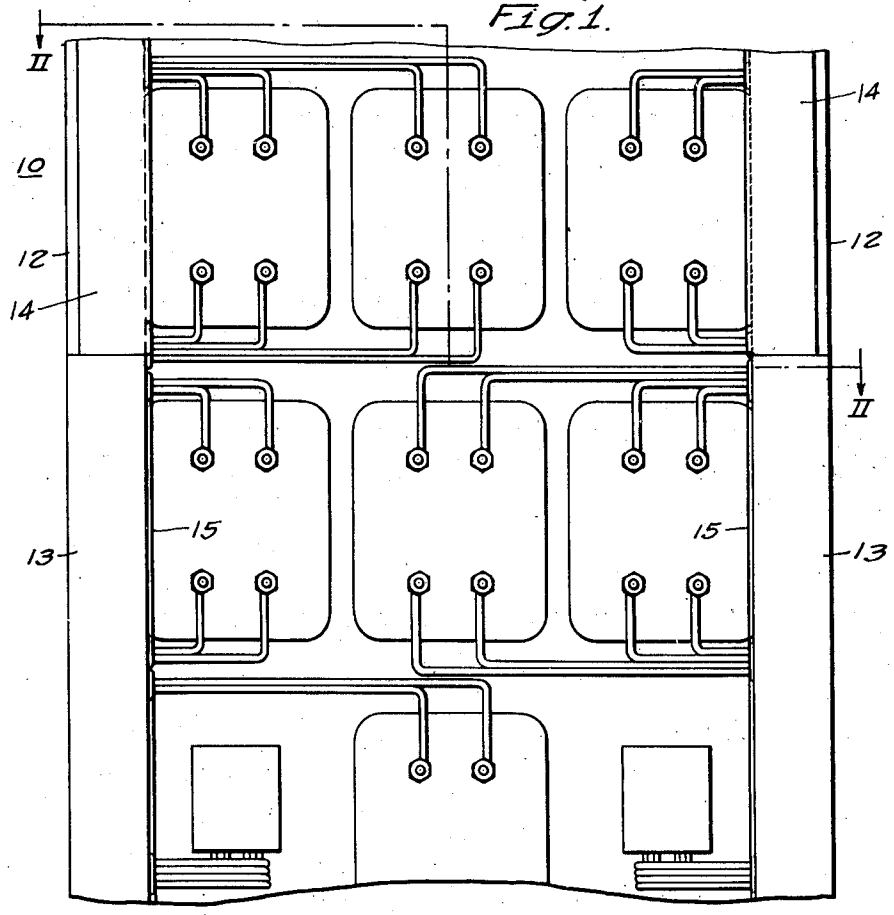
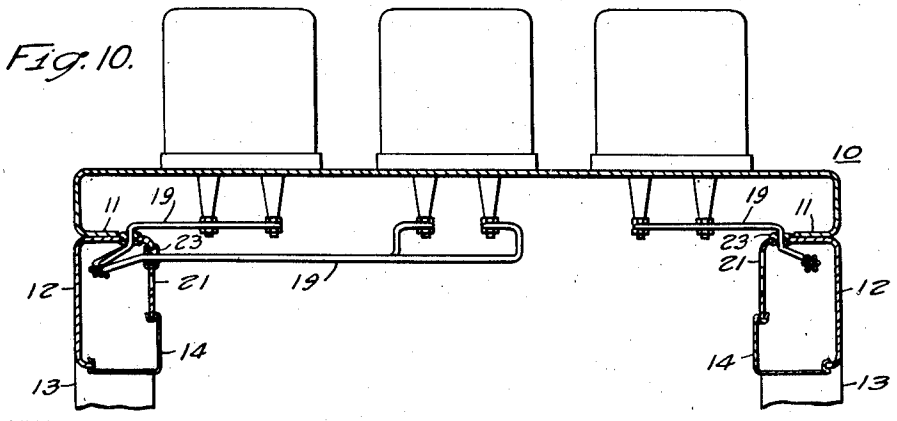


Fig. 10.



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Fig. 2.

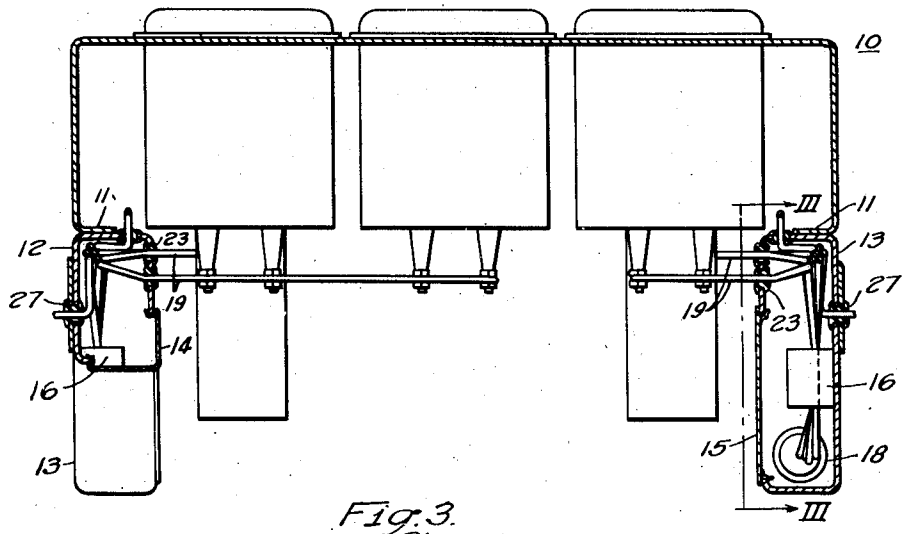


Fig. 3.

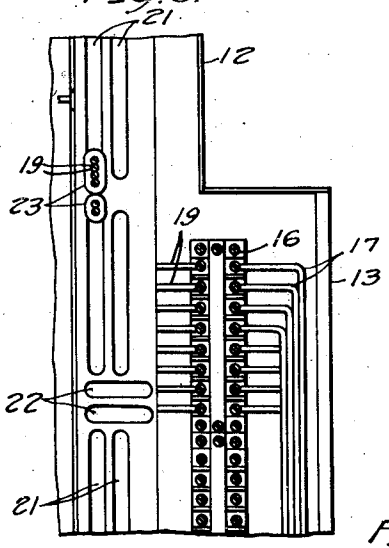


Fig. 4.

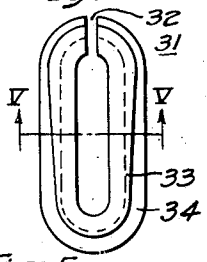


Fig. 5.

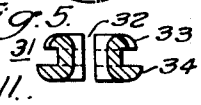


Fig. 6.

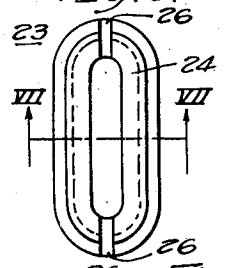


Fig. 7.

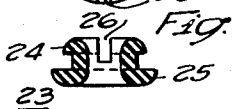


Fig. 11.

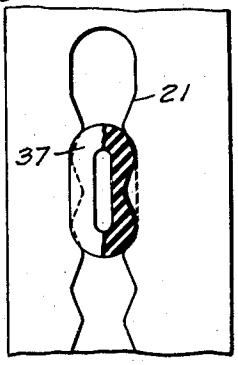


Fig. 8.

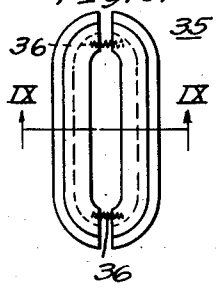


Fig. 9.



Fig. 12.

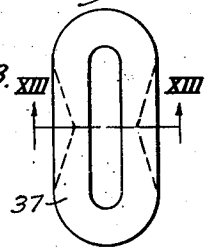
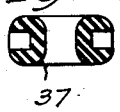


Fig. 13.



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UNITED STATES PATENT OFFICE

2,427,742

SWITCHBOARD CONSTRUCTION HAVING ADJUSTABLE GROMMET WIRE HOLDERS

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13 Claims. (Cl. 175—298)

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Our invention relates, generally, to switchboard construction and, more particularly, to the wiring of switchboard panels upon which are mounted instruments, relays and other switchboard devices.

In accordance with one method of switchboard construction which has been used heretofore, each panel comprises a unitary metallic member having one or more of its edges terminating in channel form which serves the dual purpose of making the panel self-supporting and providing a compartment, in the form of a channel well, for containing the conductors which are connected to the apparatus mounted upon the panel. In another method of construction, perforated wiring strips are secured on the rear face of the panel to form with the panel flanges troughs for the vertical runs of wires. The circuit wires enter and leave the trough by way of the perforations in the strip.

Neither of the foregoing methods has proven entirely satisfactory in all cases. Thus, when the former method is utilized, difficulty is sometimes experienced in locating the proper wires, which are concealed in the wiring channel, when making connections to the terminals of the switchboard apparatus. When the wires pass through perforations in the wiring strips they might not always be in the best possible position with relation to the terminal studs on the panels to which the wires are to be connected, thereby resulting in a poor appearance and higher cost. Furthermore, projection-mounted instruments and relays of different types may have studs of varying length, and flush-mounted apparatus may have varying case depths and stud lengths, thereby making it difficult to wire a switchboard panel by either of the foregoing methods.

An object of our invention is to provide a method of switchboard construction and wiring which will overcome the foregoing disadvantages of prior methods of construction.

A more specific object of our invention is to provide for so locating the panel wires in an enclosed raceway that they can be drawn from the enclosing raceway at a position directly opposite the terminal studs to which they are to be connected, or in the most preferred position for subsequent wiring on the panel.

Another object of our invention is to provide a wiring gutter or raceway which is suitable for use on switchboard panels having either flush or projection-mounted apparatus thereon.

A further object of our invention is to provide an enclosure for terminal blocks at the rear of a panel and to locate the terminal blocks in a suitable position in relation to the cables which connect the circuits to external points.

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Other objects of our invention will be explained fully hereinafter or will be apparent to those skilled in the art.

According to one embodiment of our invention, wire gutters are attached to the panel rear flanges. Each gutter is provided with one or more slots extending the length of the gutter. The wires are retained in the slots in any desired position by grommets, preferably composed of a resilient material and so constructed that they may be shifted along the slots by compressing the grommets with the fingers or a suitable tool. When the pressure is released the grommet returns to its normal shape and is retained in the proper position for the wire by the friction between the grommet and the sides of the slot.

For a fuller understanding of the nature and objects of our invention, reference may be had to the following detailed description, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a view, in rear elevation, of a portion of a switchboard structure embodying our invention;

Fig. 2 is a view, in section, taken along the line II—II of Fig. 1;

Fig. 3 is an enlarged view, in elevation, taken along the line III—III of Fig. 2;

Fig. 4 is an enlarged view, in elevation, of one form of the grommets utilized for protecting the wires and retaining them in the proper position in the slots;

Fig. 5 is a view, in section, taken along the line V—V of Fig. 4;

Fig. 6 is an enlarged view of a modified form of grommet;

Fig. 7 is a view, in section, taken along the line VII—VII of Fig. 6;

Fig. 8 is an enlarged view of another modification of the grommet;

Fig. 9 is a view, in section, taken along the line IX—IX of Fig. 8;

Fig. 10 is a view, in section, of a modification of the switchboard structure;

Fig. 11 is an enlarged view, in elevation, of a portion of a wiring gutter having slots of a modified form therein;

Fig. 12 is an enlarged view of a grommet suitable for use in the slot illustrated in Fig. 11; and

Fig. 13 is a view, in section, taken along the line XIII—XIII of Fig. 12.

Referring to the drawings, and particularly to Fig. 2, the switchboard panel shown comprises

a unitary metallic member 10 having its edges bent at substantially a right angle to the face of the panel and terminating in inwardly bent portions 11 at the rear of the panel. In this manner the panel is strengthened and made self supporting. A wiring gutter 12 and a combined terminal and wiring housing 13 are provided at each side of the panel for concealing and supporting the switchboard wires. The wiring gutters and housings may be composed of steel or other suitable material which is pressed into the desired shapes.

As shown, the gutter 12 is L-shaped in section with inbending flanges on both legs of the L. The housing 13 is channel-shaped in section with inbending flanges on both sides of the channel. The gutters and housings may be bolted or welded to the flanges 11 of the panel 10. A removable cover plate 14, which is L-shaped in section, is provided for the gutter 12 and a removable flat cover plate 15 is provided for the housing 13. The cover plates may be secured in position by spring clips, as shown, or they may be fastened on with screws or bolts if desired.

As shown in Figs. 1, 2 and 3 the housings 13 are of a greater width than the gutters 12, thereby providing sufficient space to enclose terminal blocks 16 at which wires 17 extending from cables 18 terminate. In accordance with usual practice, switchboard wires 19 are provided for completing the connections from the terminal blocks 16 to the apparatus mounted on the switchboard panel.

In order to facilitate the wiring of the switchboard panel as well as to protect the wires, they are enclosed in the wiring gutters 12 which continue from the top of the housings 13 to the top of the panel. Thus, the wide housings 13 may be extended only as far as is necessary to enclose the required number of terminal blocks for each panel.

In order that the switchboard wires may be drawn from the wiring gutters and housings at a position directly opposite the terminal studs to which they are connected or in the most preferred position for subsequent wiring on the panel, the wiring gutters and housings are provided with a plurality of parallel slots 21 which extend practically the full length of the gutters and housings. As shown in Fig. 3, a few horizontal slots 22 may also be provided in the gutters if desired. The slots 21 are preferably provided in adjacent sides of each gutter and housing, thereby permitting the wires to be brought out of the gutter and housing in a direction parallel to the face of the panel 10 or perpendicular to the panel face. This arrangement facilitates the making of connections to terminals which are disposed at a considerable distance behind the rear face of the panel and also to terminals which are relatively close to the rear face of the panel. In this manner the wiring connections may be readily made to apparatus of the flush-mounted type as well as of the projection-mounted type.

In order to protect the wires against abrasion and also to retain the wires in the desired position in a slot 21, elongated grommets 23 are provided. The grommets 23 are preferably composed of a resilient material such as rubber or of a suitable plastic, composition, wood, or they may even be made from metal. As shown in Figs. 6 and 7, each grommet is elongated in shape and is provided with a pair of flanges 24 and 25 for retaining the grommet in the slot 21 and for frictionally engaging the sides of the slot to retain it in any selected position in the slot. The inner flange 24 is considerably narrower than the outer flange 25, thereby permitting the grommet to be inserted in the slot by merely compressing it with the fingers or a suitable tool.

Also, after the grommet is inserted into the slot it may be slid up and down in the slot to the desired position by compressing the sides of the grommet. When the pressure is released the grommet returns to its normal shape and is retained in position by the friction between the grommet and the sides of the slot.

As shown in Figs. 6 and 7 a groove 26 is provided at each end of the grommet, thereby facilitating the compressing of the grommet to enable it to be inserted into the slot. If the grommet is composed of rubber the grooves 26 are not necessary. However, they are desirable in case the grommet is composed of plastic or metal.

After the grommet is placed in the desired position substantially opposite the terminals to which the connections are to be made, the wires for making these connections may be drawn through the grommet and the connections completed. As illustrated, the grommets may be made in several different sizes to accommodate a different number of wires. It is believed that grommets holding either two or four wires will be the most practical for switchboard panel wiring. Thus, if only two wires are to be brought out at a certain position a two wire grommet may be inserted in that position. If four wires are to be brought out in a group, a four wire grommet may be utilized. In case more than four wires are required, two grommets may be placed end-to-end in a slot as shown in Fig. 3, thereby permitting all of the wires to be brought out of the gutter relatively close together.

As shown in Fig. 2, in the event that it is desired to make connections between adjacent panels, grommets 27, which have sufficient depth to permit them to be inserted in aligned slots in adjacent wiring gutters, may be utilized. In this manner the wires may be run from a gutter on one panel to a gutter on an adjacent panel, thereby making the desired cross or inter-panel connections.

The grommet 31, shown in Figs. 4 and 5, is of a slightly different construction from the one illustrated in Figs. 6 and 7. It is provided with a slot 32 at one end and an inner flange 33 which is narrower at the end of the grommet opposite the slot 32 than it is at the end containing the slot 32. The flange 33 is narrower at all points than is the outer flange 34. The slot 32 will permit the grommet to be compressed sufficiently for the wide portion of the inner flange 33 to be inserted into a slot in the wiring gutter. When the pressure is released the grommet returns to its normal shape and the flange 33 retains it in the slot. The structure shown in Figs. 4 and 5 is probably the most suitable in case the grommets are composed of plastic or metal.

In the modification shown in Figs. 8 and 9 the grommet 35 is divided into two sections which are symmetrical in shape. The two halves are normally forced outwardly against the sides of the slot by springs 36, one of which is provided at each end of the grommet. The grommet may be inserted in the slot by compressing the two halves together against the force of the springs 36. The structure shown in Figs. 8 and 9 is also suitable in case the grommets are composed of

plastic or metal, but is not required in the event that rubber grommets are utilized.

In the modification shown in Fig. 10 the switchboard panel **10** is similar to that shown in Figs. 1 and 2 with the exception that the rearwardly extending flanges are of less depth than in the previously described panel. A panel of the type shown in Fig. 10 is preferably utilized when all or a major portion of the apparatus on the panel is of the projection-mounted type in which the terminals are relatively close to the rear face of the panel. Thus, the wiring gutters **12** are in a more advantageous position for connecting the panel wires to such terminals. As shown, the wiring slots **21** may be provided in adjacent sides of the gutters to permit the wires to extend either parallel to the rear face of the panel or perpendicular to the rear of the panel in the manner hereinbefore described. In this manner the wires may be brought out of the wiring gutters in the direction which is most suitable for connecting to the proper terminals of the apparatus.

As illustrated in Fig. 11, the sides of the slots **21** may be serrated to assist in holding the grommets **37** in the desired position in the slot. Likewise, the edges of the grommets **37** may be similarly serrated, as shown in Figs. 12 and 13. In this manner, a grommet is prevented from moving vertically in a slot by a wedge action unless the grommet is compressed.

From the foregoing description it is apparent that we have provided an improved method of constructing and wiring switchboard panels which will not only simplify the wiring operation but also materially improve the appearance of the completed panel as compared with previously known methods of panel wiring. Furthermore, the wires are completely protected against abrasion of the insulating covering and the cable terminals as well as the wiring terminal blocks are also fully protected by the enclosed wiring gutters.

Since numerous changes may be made in the above described construction and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim as our invention:

1. A switchboard comprising a panel member, terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a longitudinally extending slot therein, and a plurality of elongated grommets slidably disposed in said slot for receiving circuit wires for connection to said terminals, the length of said slot being greater than the total length of the grommets disposed therein, said grommets being expansible to engage the sides of said slot to retain the grommets at any desired position along said slot.

2. A switchboard comprising a panel member, terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a longitudinally extending slot therein, and a plurality of elongated grommets slidably disposed in said slot for receiving circuit wires for connection to said terminals, the length of said slot being greater than the total length of the grommets disposed therein, said grommets being composed of resilient material and expansible to engage the sides of said slot to retain the grommets at any desired position along said slot.

3. A switchboard comprising a panel member, terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a longitudinally extending slot therein, and a plurality of elongated grommets slidably disposed in said slot for receiving circuit wires for connection to said terminals, the length of said slot being greater than the total length of the grommets disposed therein, said grommets having flanges thereon for retaining them in the slot and being expansible to engage the sides of said slot to retain the grommets at any desired position along said slot.

4. A switchboard comprising a panel member, terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a longitudinally extending slot therein, and a plurality of elongated grommets slidably disposed in said slot for receiving circuit wires for connection to said terminals, the length of said slot being greater than the total length of the grommets disposed therein, said grommets being expansible to engage the sides of said slot to retain the grommets at any desired position along said slot and being releasable from said sides for movement in said slot.

5. A switchboard comprising a panel member, terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a longitudinally extending slot therein, and a plurality of elongated grommets slidably disposed in said slot for receiving circuit wires for connection to said terminals, the length of said slot being greater than the total length of the grommets disposed therein, said grommets being composed of resilient material expansible for frictionally engaging the sides of said slot to retain the grommets at any desired position along said slot and being releasable from said sides by pressure for movement in said slot.

6. A switchboard comprising a panel member, terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a slot therein, an elongated grommet disposed in said slot for receiving circuit wires for connection to said terminals, said grommet frictionally engaging the sides of said slot to retain the wires in position in said slot and being cut at one end thereof to permit the insertion of the grommet into said slot.

7. A switchboard comprising a panel member, terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a slot therein, an elongated grommet disposed in said slot for receiving circuit wires for connection to said terminals, said grommet frictionally engaging the sides of said slot to retain the wires in position in said slot, said grommet being divided into two sections to permit the insertion of the grommet into the slot.

8. A switchboard comprising a panel member, terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a slot therein, an elongated grommet disposed in said slot for receiving circuit wires for connection to said terminals, said grommet frictionally engaging the sides of said slot to retain the wires in position in said slot, said grommet being divided into two sections, and resilient means dis-

posed between said sections to permit the insertion of the grommet into the slot.

9. A switchboard comprising a panel member, terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a slot therein, an elongated grommet disposed in said slot for receiving circuit wires for connection to said terminals, said grommet being composed of resilient material for frictionally engaging the sides of said slot to retain the wires in position in said slot, said grommet being cut at one end thereof, thereby permitting it to be compressed for insertion into the slot.

10. A switchboard comprising a panel member having a rearwardly extending flange, terminals at the rear of the panel for electrical apparatus mounted on the panel, a channel-shaped wiring gutter secured to said flange and spaced from the rear of the panel and having a longitudinally extending slot therein, and a plurality of elongated grommets slidably disposed in said slot for receiving circuit wires for connection to said terminals, the length of said slot being greater than the total length of the grommets disposed therein, said grommets being expansible to engage the sides of said slot to retain the grommets at any desired position along said slot.

11. A switchboard comprising a panel member having a rearwardly extending flange, terminals at the rear of the panel for electrical apparatus mounted on the panel, a channel-shaped wiring gutter secured to said flange and spaced from the rear of the panel and having a plurality of longitudinally extending parallel slots in adjacent sides of the gutter, a part of said slots being in the side of the gutter nearest the rear face of the panel, and a plurality of elongated grommets slidably disposed in each of said slots for receiving circuit wires for connection to said terminals, the length of each slot being greater than the total length of the grommets disposed therein, said grommets being expansible to engage the sides of said slots to retain the grommets at any desired position along said slots.

12. A switchboard comprising a panel member,

terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a slot therein, said slot having serrated sides, and an elongated grommet disposed in said slot for receiving circuit wires for connection to said terminals, said grommet engaging the sides of said slot to retain the wires in position in said slot.

13. A switchboard comprising a panel member, terminals at the rear thereof for electrical apparatus mounted on the panel, a wiring gutter disposed at the rear of the panel and having a slot therein, said slot having serrated sides, and an elongated grommet disposed in said slot for receiving circuit wires for connection to said terminals, said grommet engaging the sides of said slot to retain the wires in position in said slot, the edges of said grommet having serrations therein similar to the serrations in the sides of said slot.

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