

Dec. 29, 1936.

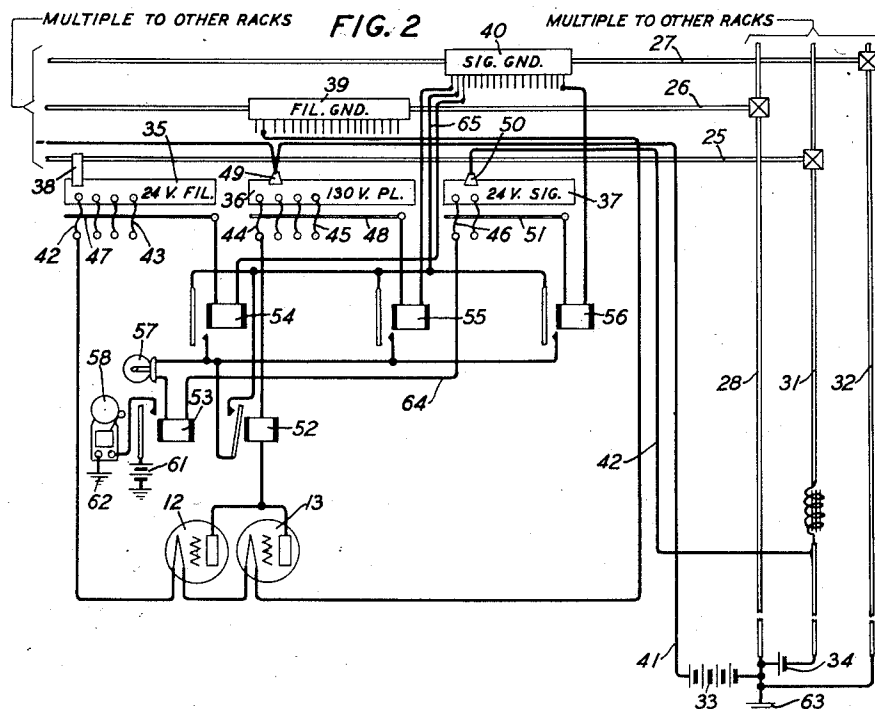
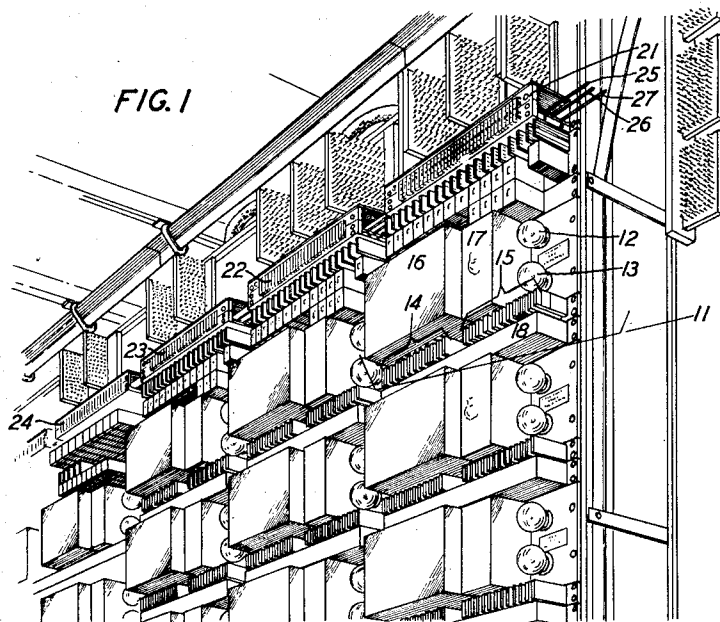
A. KENNER ET AL

2,065,897

FUSE PANEL

Filed June 1, 1935

3 Sheets-Sheet 1



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FIG. 3

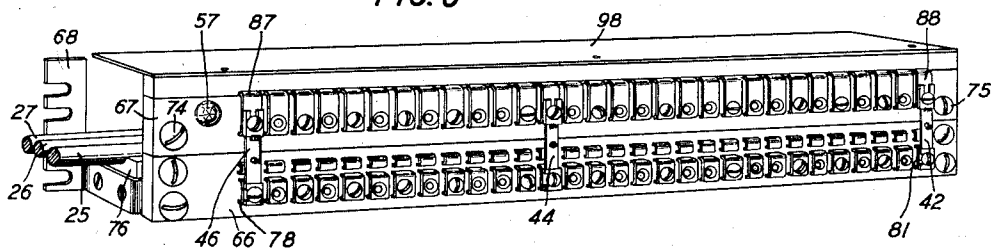
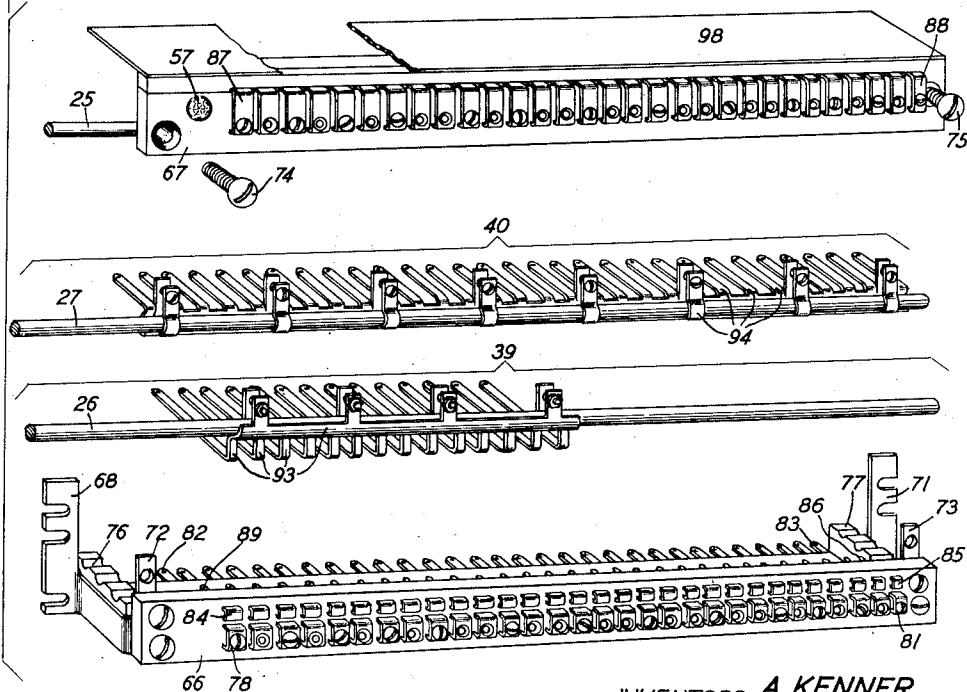


FIG. 4



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FIG. 5

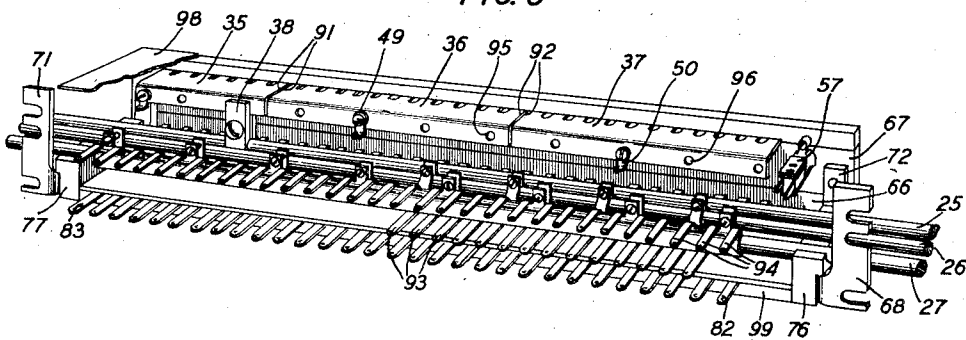
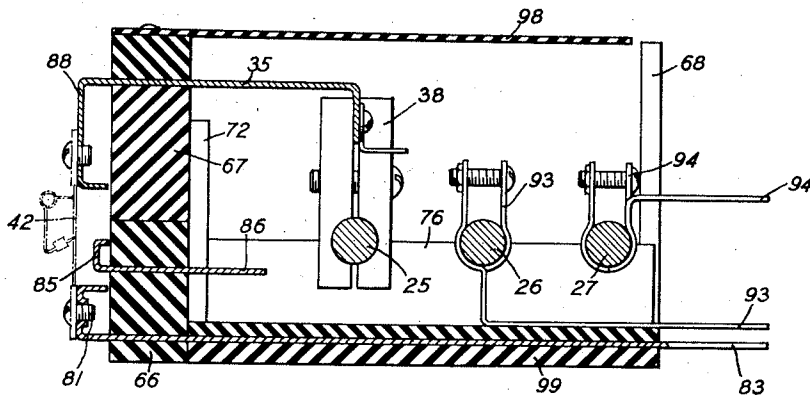


FIG. 6



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UNITED STATES PATENT OFFICE

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FUSE PANEL

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Application June 1, 1935, Serial No. 24,498

9 Claims. (Cl. 179-91)

This invention relates to a fuse panel and particularly to a fuse panel of a type adapted to be mounted on a relay rack.

5 An object of the invention is the provision of a simple unitary fuse panel capable of use with a plurality of power sources of different potentials.

10 Another object of the invention is the provision of a fuse panel which may be mounted on a relay rack together with the other apparatus used in the circuits which are to be protected.

15 In accordance with a feature of the invention, the bus bars are supported in such a manner by the fuse panel that each bar is separated electrically from the others, thereby eliminating the necessity of providing an insulating covering for each bus bar. Further, in accordance with this arrangement, standard stock lengths of the bus bars may be conveniently utilized.

20 In accordance with a further feature of the invention an upper cover-like portion of the panel may be conveniently removed from the base portion of the panel in order to facilitate the positioning of the bus bars.

25 In accordance with a still further feature of the invention, a common feeder plate is provided which terminates in individual feeder terminals. Means, specifically slots, are provided on the common feeder plate whereby the plate may be conveniently separated into electrically distinct sections in accordance with the different potentials to be supplied.

30 In accordance with the usual practice heretofore, most of the units used in telephone central office circuits such as relays, condensers, resistances and the like have been mounted on a centralized relay rack. The fuses have usually been mounted on separate panels, however, thereby necessitating interwiring between the relay racks and the fuse panels. In accordance with the present invention, a fuse panel is provided which may be mounted on the relay rack together with the other apparatus of the circuit, the arrangement being such that the one unitary fuse panel may be used for the supply of the several different potentials which may be required by the particular circuit.

35 In accordance with a specific arrangement of the fuse panel, it comprises two sections; a lower base section provided with mounting brackets and bus bar supports and upon the face of which are mounted individual fuse posts and alarm posts and an upper cover-like section 40 within which is mounted the common feeder

plate. The individual fuse posts in which the plate terminates appear on the face of this section; an indicator lamp also being mounted thereon. The panel may be either molded or fabricated of a suitable material.

45 A thorough understanding of the arrangement of the type of fuse panel contemplated by the present invention, as well as an appreciation of the various advantageous features thereof, may be gained from consideration of the following detailed description and the annexed drawings, in which:

Fig. 1 is a front view, in perspective, of a portion of a relay rack mounted telephone repeater installation, several fuse panels of the type contemplated by the present invention being shown near the top of the rack;

Fig. 2 is a schematic showing of a power supply circuit of the type used for energizing the repeater tubes, the fuse equipment and alarm circuit used therewith being shown;

Fig. 3 is a front view, in perspective, of a fuse panel of the type contemplated by the invention;

Fig. 4 is an exploded view of the fuse panel shown in Fig. 3;

Fig. 5 is a rear view, in perspective, of the fuse panel shown in Fig. 3, a portion of the upper section being broken away; and

Fig. 6 is an end sectional view of the fuse panel showing particularly the arrangement of the bus bars and the connecting means associated therewith.

Referring now to the drawings, there is shown in Fig. 1 a portion of a relay rack mounted telephone repeater installation of the nature commonly provided in toll offices. The type of repeater selected for illustration is the "22" type, which type ordinarily utilizes two vacuum tubes for each repeater unit. Repeater unit 11, for example, includes repeater tubes 12 and 13, and associated apparatus such as resistance banks 14 and 15, as well as transformers, rheostats, filters, balancing networks, and the like; shielding covers 16, 17, and 18 enclosing these last mentioned elements of the repeater unit. Several fuse panels 21, 22, 23, and 24 of the type contemplated by the present invention are shown mounted near the top of the rack; the arrangement of the panels being described in detail further on in the specification. Terminal strips, resistances and encased relays associated with the repeater units are also shown mounted near the top of the rack. Bus bars 25, 26, and 27 are also shown, the arrangement and purpose of 55

which will be brought out in the description of Fig. 2.

In accordance with the usual practice, the various repeater units and associated equipment are assembled on the rack in the shops, the rack wiring being done at that time. The equipped racks are then shipped to the toll offices as required and set up, the connections to the telephone office circuits being made at that time.

Referring now to Fig. 2, the repeater tubes 12 and 13 are shown together with a power supply circuit for their energization. Only that part of the repeater circuit necessary for proper illustration of the features of the invention is shown; the grid and complete plate connections of the tubes not being shown. Bus bars 28, 31, and 32, which are adapted to supply one battery potential and two ground potentials, are provided being electrically connected, respectively, to bus bars 26, 25, and 27. Batteries 33 and 34 are provided for energizing the plate and filament electrodes, respectively, of the repeater tubes.

The principal parts of a fuse panel of the type contemplated by the invention are shown schematically in this figure as it is believed that the detailed description of the arrangement of the panel which will be given subsequently will be more easily understood if the functions of the various parts in the circuit be briefly described at this time.

The battery potential supply part of the fuse panel is shown divided into three sections, 35, 36, and 37, the sections supplying, respectively, 24 volt filament battery, 130 volt plate battery, and 24 volt signal battery. Section 35 receives its potential from bus bar 25 being connected thereto by connector 38 while sections 36 and 37 receive their potentials from ordinary heavy wire power leads 41 and 42, respectively, connections being made thereto by respective connectors 49 and 50. The ground potential supply part of the fuse panel is shown in two sections 39 and 40, these sections being directly connected, respectively, to bus bars 26 and 27. No fusing equipment is required for the ground potential supply.

It is necessary that the battery potential supply sections be provided with fuse equipment, several of the fuses, 42, 43, 44, 45, and 46, being shown. These fuses are preferably of the "indicator" type as described, for example, in Craft United States Patent 817,959, issued April 17, 1906. These fuses when "blown" are arranged to complete an alarm circuit such a circuit being disclosed in this figure. Each section is provided with a common alarm strip 47, 48, and 51, respectively, contact between one of these strips and the associated section of the fuse panel resulting from the "blowing" of a fuse on said section. Included in the alarm circuit are normally operated relay 52, normally deenergized relays 53, 54, 55, and 56, indicator lamp 57, alarm bell 58, and battery 61.

Assuming now, by way of example, that fuse 42 "blows", thus interrupting the normal energizing circuit of the repeater tube filaments, contact is made through the "blown" fuse with alarm bar 47, thereby completing a circuit from battery 34, bus bars 31 and 25, connector 38, common supply plate 35 of the fuse panel, through a portion of "blown" fuse 42 to alarm strip 47, winding of relay 54, ground supply plate 40 of the fuse panel, and through bus bars 27 and 32 to ground 63, relay 54 operating over this

circuit. Operation of relay 54 causes, in turn, the operation of relay 53 and the energization of indicator lamp 57 over a circuit traced from battery 34, power lead 42, connector 50, common supply plate 37 of the fuse panel, fuse 46, conductor 64, winding of relay 53, lamp 57, make contact of relay 54, conductor 65, ground supply plate 40 of the fuse panel and bus bars 27 and 32 to ground 63. Operation of relay 53 causes, in turn, the energization and operation of alarm bell 58 over a circuit traced from battery 61, make contact of relay 53, bell 58 to ground 62.

Sounding of alarm bell 58 and lighting of lamp 57 indicate to the wire chief or other person in charge of maintenance that a fuse has "blown", whereupon steps are taken to replace the fuse and to remove the "short" from the line if one be found to exist.

"Blowing" of a fuse on another section of the battery supply portion of the fuse panel results, in a similar manner, in lighting lamp 57 and sounding bell 58. Assuming, for example, that fuse 44 "blows" thereby interrupting the normal plate supply circuit of the repeater tubes, relay 52, which is normally energized its winding being in series with the plate supply circuit, deenergizes. As the relay armature falls back a circuit is completed which may be traced from battery 34, power lead 42, connector 50, common supply plate 37 of the fuse panel, fuse 46, conductor 64, winding of relay 53, lamp 57, break contact of relay 52, conductor 65, ground supply plate 40 of the fuse panel and bus bars 27 and 32 to ground 63. Relay 53 and lamp 57 are energized over this circuit and relay 53, by its operation, causes energization of bell 58 as previously described.

Turning now to a description of the fuse panel itself and referring particularly to Figs. 3 to 6, a fuse panel is shown comprising two major sections, a lower base member 66 and an upper cover-like member 67. These sections may be either molded or fabricated of a suitable insulating material. Base member 66 is provided with mounting brackets 68 and 71 for mounting the panel on the relay rack as well as lugs 72 and 73 upon which upper section 67 is mounted when the panel is assembled being held in place thereon by bolts 74 and 75. Bus bar supports 76 and 77 are provided, one at each end of the section. Each of these supports is grooved, a trough being provided for each bus bar to be associated with the panel so that when the bus bars are positioned in the panel they are securely held each in its respective place out of contact with the other. This feature eliminates the necessity of providing an individual insulating covering for each bus bar. Individual fuse posts, as 78 and 81, are mounted on base member 66, each of these posts being provided at the rear of the panel with an individual terminal punching as 82 and 83. Alarm contacts, as 84 and 85, are also mounted on the base member, each contact being provided with an individual terminal, as 86 and 89, these terminals being strapped as desired to form common alarm bars, such, for example, as bars 47, 48, and 51 of Fig. 2.

Upper section 67 of the fuse panel acts as a support for a common U shaped feeder member of a suitable conductive material. This member terminates at the front of the panel in a number of individual fuse posts, as 87 and 88, and extends down over one of the bus bars in the rear of the panel. As shown in Fig. 5, 75

the space punched out between the individual fuse posts extends back through the front of the panel for a short distance. This feature permits the feeder plate to be separated into electrically distinct sections as desired simply by cutting the plate (i. e., extending a selected slot or space) with a hack saw. The plate of Fig. 5 is shown divided into three distinct sections 35, 36, and 37 by means of saw cuts 91 and 92. The plate may be divided into any required number of sections according to the potentials to be supplied, three sections being shown in view of the fact that three battery potentials are required in the circuit of Fig. 2.

Holes, as 95 and 96, are punched in the rear edge of the common supply plate at frequent intervals in order to facilitate connection of the power leads. Connection between the major supply lead, here shown as bus bar 25, and the associated section 35 of the supply plate is commonly made by a clamp type of terminal 38. The minor power leads, usually ordinary heavy insulated wires, are commonly connected to the associated sections 36 and 37 by terminal punchings 49 and 50.

After the relay rack has been installed in the central office and the local connections to the fuse panels are to be made, the upper section 67 is usually removed from base member 66 after which the bus bars 25, 26, and 27 are set in place in the troughs provided in supports 76 and 77. Stock lengths of bus bar may be used with this fuse panel which is, of course, an economical feature. After the bus bars have been set in place, member 67 is usually replaced on base member 66 and the connections are made from the rear of the rack.

In accordance with the embodiment selected for description it is assumed that bus bars 26 and 27 are to supply ground potential, hence no fuses need be associated therewith. Connections to these bus bars are made by means of any of the terminal punchings provided on the respective common connector plates 93 and 94. As pointed out above, connection between bus bar 25 and the feeder plate is made by means of a special clamping connector while the minor power leads are connected by means of ordinary terminal punchings.

As shown clearly in Fig. 6 the fuse panel is protected by insulating cover 98 on the top and by insulating base 99 on the bottom so that other apparatus of the circuits may be mounted both above and below the fuse panel and in actual contact therewith without giving rise to any objectionable consequences such as electrical "shorts" or "grounds".

While certain embodiments of the invention have been selected for detailed description, the invention is not of course limited in its application to the embodiments described. These embodiments should be taken as illustrative of the invention rather than restrictive thereof.

What is claimed is:

1. A fuse panel comprising two sections, a plurality of individual fuse posts mounted on one of said sections and a common supply plate mounted on the other of said sections, said supply plate terminating at its front edge in a plurality of individual fuse posts and being provided with a plurality of notches effective to facilitate separation of the plate into electrically distinct sections.

2. In a fuse panel of the type comprising two sections, a plurality of individual fuse posts

mounted on one of said sections, a U shaped supply plate mounted on the other of said sections, one leg of said U shaped plate being divided into a plurality of individual fuse posts, and means on the base portion of said U shaped plate effective to facilitate separation of said plate into electrically distinct sections.

3. In a fuse panel of the type comprising two sections, a plurality of individual fuse posts mounted on one of said sections and a U shaped supply plate mounted on the other of said sections, one leg of said U shaped plate being divided into a plurality of individual fuse posts, the base portion of the U shaped plate being provided with a plurality of notches effective to facilitate separation of the plate into electrically distinct sections.

4. In a fuse panel of the type comprising two sections, a common supply plate mounted on one of said sections, said plate terminating at its front edge in a plurality of individual fuse posts, a plurality of individual fuse posts mounted on the other of said sections, and means also mounted on said other section for supporting a plurality of bus bars, said supporting means being effective to hold each bus bar out of electrical contact with the other bus bars.

5. In a fuse panel of the type adapted to be mounted on a relay rack, a base section and an upper section, mounting brackets on said base section, a plurality of fuse posts mounted on said base member, means for supporting a plurality of bus bars also mounted on said base member, said supporting means being effective to hold each bus bar out of electrical contact with the other bus bars and a common supply plate mounted on said upper section, said supply plate terminating at its front edge in a plurality of individual fuse posts.

6. In a fuse panel of the type adapted to be mounted on a relay rack, a base section and an upper section, mounting brackets on said base section, a plurality of fuse posts mounted on said base member, means for supporting a plurality of bus bars also mounted on said base member, said supporting means being effective to hold each bus bar out of electrical contact with the other bus bars, a common supply plate mounted on said upper section, said supply plate terminating at its front edge in a plurality of individual fuse posts, and means on said supply plate effective to facilitate separation of the plate into electrically distinct sections.

7. A fuse panel comprising two sections, a plurality of individual fuse posts mounted on one of said sections, a plurality of fuse posts mounted on the other of said sections, a common supply plate, the fuse posts mounted on said other section being normally connected electrically by said supply plate, and means for separating said normally connected fuse posts into a plurality of electrically distinct groups.

8. A fuse panel of the type adapted to be mounted on a relay rack comprising a base member of insulating material, a terminal strip mounted on said base member at right angles thereto, a plurality of individual fuse posts mounted on said terminal strip, terminals for said fuse posts at the rear of the terminal strip, a plurality of bus bars in the rear of the terminal strip mounted on said base member and connecting means associated with said bus bars.

9. In a fuse panel of the type adapted to be mounted on a relay rack, a base member and a cover member, mounting brackets associated 75

- with said base member, a plurality of fuse posts mounted on the front of said base member, terminals for said fuse posts at the rear of the base member, a plurality of alarm contacts mounted on the front of said base member, terminals for said alarm contacts at the rear of the base member, means for supporting a plurality of bus bars also mounted on said base member, said supporting means being effective to hold each bus bar out of electrical contact with the other bus bars, terminals adapted to be associated with bus bars when located in said supporting means, a common supply plate mounted on said cover member, said supply plate terminating at the front of said cover member in a plurality of individual fuse posts, and means associated with said supply plate at the rear of said cover member for connecting said plate to external circuits.
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