

Dec. 19, 1950

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2,534,864

TERMINAL STRIP FOR ELECTRICAL INTERCONNECTIONS

Filed May 22, 1947

FIG. 1

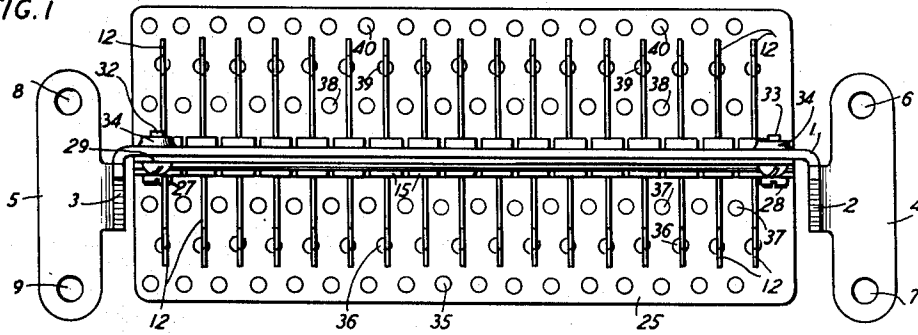


FIG. 2

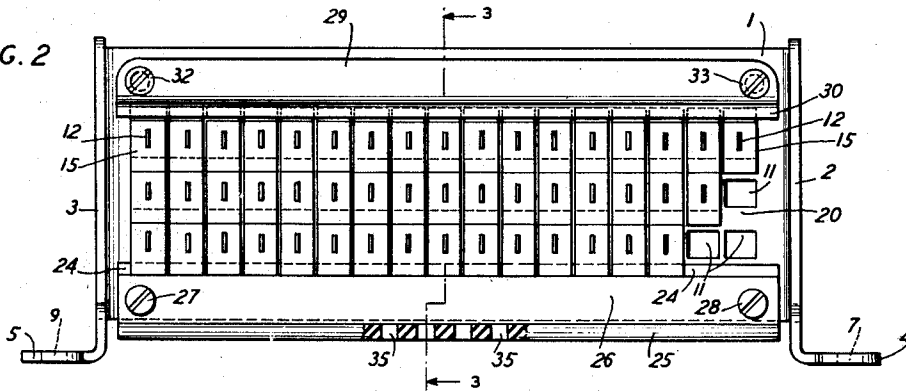


FIG. 3

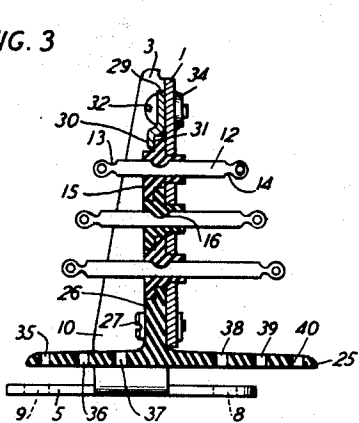
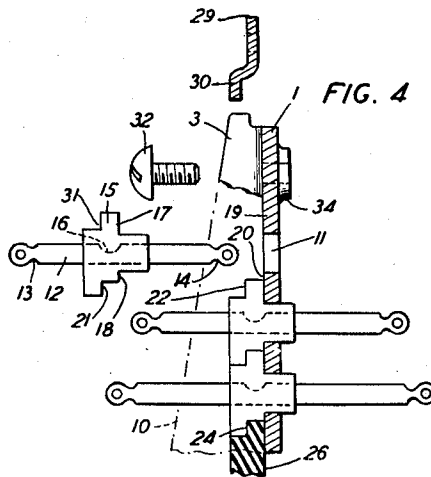


FIG. 4



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2,534,864

TERMINAL STRIP FOR ELECTRICAL INTERCONNECTIONS

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Application May 22, 1947, Serial No. 749,624

5 Claims. (Cl. 173-324)

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This invention is an improved terminal strip for use in effecting interconnection in circuits in the electrical industry, especially in the communications industry. More particularly, this is an improved terminal strip in which the individual terminals may be removed and replaced when desirable, thereby avoiding the expense of replacing the entire terminal strip.

An object of this invention is the improvement of terminal strips.

A more particular object of this invention is the provision of a terminal strip in which individual terminals when found to be defective may be readily replaced.

Terminal strips are presently in use in very large numbers in the electrical industry particularly in the communications industry. They are employed largely in terminating the interior and exterior wiring connections of circuits. For instance, the relay and coil equipment for a group of trunk circuits may be mounted on a relay rack and the conductors which extend to external connections may be bound in a single local cable and run from the relays and coils to a terminal strip at the top or bottom of the rack, where the tip, ring, sleeve and lamp connections of each of forty-eight trunks, for instance, may be soldered to four terminals in each of forty-eight rows on one side of the terminal strip. This work may conveniently be performed on a production basis in the shop. In the telephone exchange an individual cable having forty-eight four-wire circuits, one for each trunk, may be connected to the opposite ends of the same terminals on the terminal strip, and run from these to the trunk operator's position at a switchboard.

If a terminal becomes loose, it frequently is dislodged from its normal position and it, or the solder or wires connected to it, engage other wiring causing short circuits. When such condition prevails, it has generally been necessary to replace the entire terminal strip. This involved not only the loss of the damaged terminal strip but the loss of time necessary to disconnect, reconnect and test all of the associated wiring. In some cases, after a number of such replacements in the same position, particularly when the wiring and insulation becomes old and brittle, it is necessary to run in new local wiring or cabling or both. The present invention is designed to alleviate this difficulty.

A feature of the present invention is a capsule type terminal which can readily be removed from and replaced by another in a terminal strip assembly.

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A further feature of the present invention is a meshing or nesting arrangement of individual terminals in a terminal strip assembly.

Another feature of the invention is a locking arrangement which cooperates with the meshing or nesting arrangement of the individual terminals to lock all of the terminals in position.

These and other features of the invention will be made apparent from the following description when read with reference to the associated drawing which exemplifies a preferred embodiment of the invention. It is particularly pointed out, however, that the invention is not limited to the embodiment exemplified herein, but may be incorporated in a number of forms readily suggested by the following disclosure to those skilled in the art.

In the drawing:

Fig. 1 is a plan view;

Fig. 2 is a front elevation, partly in section;

Fig. 3 is a right-section through the line 3-3 of Fig. 2, as seen in the direction of the arrows; and

Fig. 4 is an enlarged and exploded view of a portion of Fig. 3 of the terminal strip of the present invention.

Refer now in Figs. 1, 2, 3 and 4. The terminal strip assembly comprises a bent metal frame which may, for instance, be of cold-rolled steel, or of aluminum, having a vertical plate 1, and two forwardly projecting arms 2 and 3 at the right-hand and left-hand ends thereof, respectively. The lower portion of the ends are bent outwardly at right-angles to form horizontal bases 4 and 5, at the right-hand and left-hand ends, respectively, of the frame. The bases 4 and 5 each are provided with apertures, such as 6 and 7, 8 and 9, respectively, to accommodate bolts or screws for mounting the terminal strip. The forward edge of the right and left-hand arms 2 and 3, as viewed in Figs. 1 and 2 may be tapered from the base to the top, as at 10, in Fig. 3.

The vertical plate has an individual aperture such as 11, preferably square or rectangular, for each individual terminal. These apertures are arranged in horizontal and vertical alignment. The length and height of the vertical plate portion 1 of the terminal strip, and the number of apertures per vertical or horizontal row, may be varied to suit conditions.

Each terminal, such as 12, Fig. 4, is a metallic conductor, preferably punched from flat strip. The terminals in the successive rows from top to bottom may be of increasing lengths, as in-

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licated in Fig. 3, to make them more accessible. The upper and lower edges of each terminal near its ends may be provided with small indentations, such as the semicircular indentations 13 and 14, for convenience in attaching the individual wires, prior to soldering. The end portions of the terminals may be provided with apertures in which the connecting wires are inserted. These end portions, obviously, may be of any of a wide variety of contours and shapes. Each terminal is provided, intermediate its ends, with an irregularly shaped moulded insulation element. The terminal may be provided with another indentation, such as semicircular indentation 16, into which the moulding material may flow to more securely bind the terminal in the element.

The right-hand end of each insulating element, such as element 15, as seen in Fig. 4, may be of square or rectangular section, corresponding to the boundary of the aperture 11, into which the element fits snugly. Transverse shoulders 17 and 18 on the element abut the left-hand surface of the vertical plate 1 at 19 and 20, above and below aperture 11, respectively. To the left of the shoulder 18, a transverse shoulder 21 of each insulating element 15, in each row above the bottom row, abuts the transverse shoulder 22 of the insulating element in position in the adjoining lower row, to lock the lower insulating element in position. The insulating elements are all of the same shape. The shoulder corresponding to shoulder 21 of each insulating element 15 in the bottom horizontal row abuts the vertical surface of a transverse rectangular notch 24 in the left-hand upper corner of the fanning strip 25, as seen in Fig. 4. The fanning strip 25 has a horizontal base projecting forwardly and rearwardly of the vertical plate 1, below the vertical plate. The horizontal plane of the lower edge of the vertical plate 1 is spaced from the horizontal plane of the bottom of the bases 4 and 5, to accommodate the horizontal base of the fanning strip, which fanning strip is provided with an apertured vertical element 26, integral with the base, through which apertures the fanning strip is secured to the vertical plate by means of screws 27 and 28 which pass through the apertures to engage tapped holes in the vertical plate in registration therewith.

The horizontal base 25 of the fanning strip is provided to the front and rear of vertical plate 1, as seen in Fig. 1, with an individual aperture for each terminal, such as apertures 35, 36 and 37 on the front and apertures 38, 39 and 40 on the rear of the fanning strip. Through these individual apertures the conductors to be connected to the terminals are led for connection to the individual terminals. The middle horizontal row of apertures in the front and rear portions of the base of the fanning strip may be staggered as indicated in Fig. 1, with respect to the adjacent outer and inner horizontal rows for more effective separation of the conductors. The apertures in the fanning strip may be arranged in other patterns if desired.

A clamp 29 extends substantially across the upper front surface of the vertical plate 1. The clamp is provided with an offset tongue 30 which projects into a notch, such as 31, in alignment in all of the insulating elements of the top row of elements. The clamp may be apertured near its right-hand and left-hand ends to accommodate screws 32 and 33 which register with tapped

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holes in bosses, such as 34, on the rear surface of the vertical plate 1. The clamp 29 locks the top row of insulating elements and their terminals in position. Each of the insulating elements in the next lower row is correspondingly locked by the insulating element of the next row above with which it meshes.

In removing a defective terminal, it is only necessary to disconnect the wiring attached to the particular terminal and remove the clamp 29 by removing screws 30 and 31. A terminal in the upper row may then be withdrawn. If the defective terminal is in one of the lower rows, it is obviously necessary to first partially withdraw the terminal or terminals directly above it in vertical alignment. The manner of replacing a terminal should be obvious.

At the sacrifice of some flexibility, it is obvious that a number of terminals may be combined in an integral group if desired.

What is claimed is:

1. In an electrical distribution system, a terminal strip having a single integral metal plate, a plurality of apertures in said plate for mounting a plurality of individually demountable single electrical terminals in horizontal and vertical rows on said strip, each of said terminals arranged for electrical connection on opposite sides of said strip, individual insulators surrounding each of said terminals, each of said insulators meshing with another of said insulators on said strip and a single locking element for locking said enmeshed terminals on said strip.

2. In an electrical distribution system, a terminal strip, means therein for mounting a plurality of individually demountable single electrical terminals in horizontal and vertical rows, said means comprising an apertured plate, individually insulated terminals positioned in the apertures of said plate, the insulation on each of said terminals shaped to mesh with insulation on another of said terminals so as to mutually fix all of said terminals in position and a single locking element, said element engaging the terminals in a single row so as to, cooperatively with said meshing, lock all of said terminals in position.

3. In an electrical distribution system, a terminal strip assembly comprising a single integral metal element, said element including a first means for mounting said assembly and a second means for mounting a plurality of readily demountable and mountable individual terminal units on said element, said first means comprising a bent apertured projection on said element, said second means consisting of a flat plate portion of said element having a plurality of apertures, said apertures arranged in horizontal and vertical rows, said units each comprising a single conductor individually molded in a formed insulating block, said conductor extending entirely through said block, the ends of said conductor projecting from opposed ends of said block, each of said blocks when mounted projecting through an individual one of said apertures in said plate portion, to afford means for connection to each of said conductors on each side of said plate portion, each of said blocks having a shoulder abutting a common surface of said plate portion, each of said blocks arranged for mutual intermeshing with others of said blocks and a single locking bar for locking said intermeshed blocks.

4. In an electrical distribution system, a terminal strip assembly having a single integral metal plate, said plate having a plurality of apertures therein, said assembly including a plurality

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of readily mountable and demountable terminal units, each of said units having an individual insulator projecting when mounted into an individual one of said apertures, an individual projection forming part of each of said insulators, each of said projections abutting the surface of said plate about its individual aperture, all of said projections abutting on the same side of said plate, an individual electric conductor in each of said units molded in its individual insulator, each of said conductors projecting through its individual insulator and its associated aperture and extending externally from opposed ends on said insulator to afford means for connection to opposite ends of said conductor on opposite sides of said plate, said insulators including mutual intermeshing projections, and a common interlocking bar for locking all of said intermeshed insulators.

5. In an electrical distribution system, a terminal strip assembly having a single integral metallic plate element, a plurality of apertures in said element, a plurality of electrical conductors, each of said conductors molded individually in insulating elements intermediate the ends of said conductors, said insulating elements readily mountable in and demountable from said apertures, each of said conductors projecting externally from opposed ends of its individual insulating element, each of said insulating elements when mounted projecting through an individual one of said apertures from one side of said plate

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element to the other side of said plate element, so that an electrical connection may be made to each of said conductors on each side of said plate element, said insulating elements each having individual projections arranged to afford mutual interlocking means for said insulating elements on the same side of said plate element, and a metallic clamping element arranged to engage with a projection on an insulating element when said insulating element is mounted in an aperture in an outer row on said plate, to, cooperatively with said mutual interlocking, secure said insulated conductors in said terminal strip.

MORRIS FRITTS.

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