Dec. 19, 1961 F. J. SCHMID 3,014,086

ELECTRICAL DISTRIBUTION BOX AND CONNECTOR

Filed April 28, 1959

Fig. 1

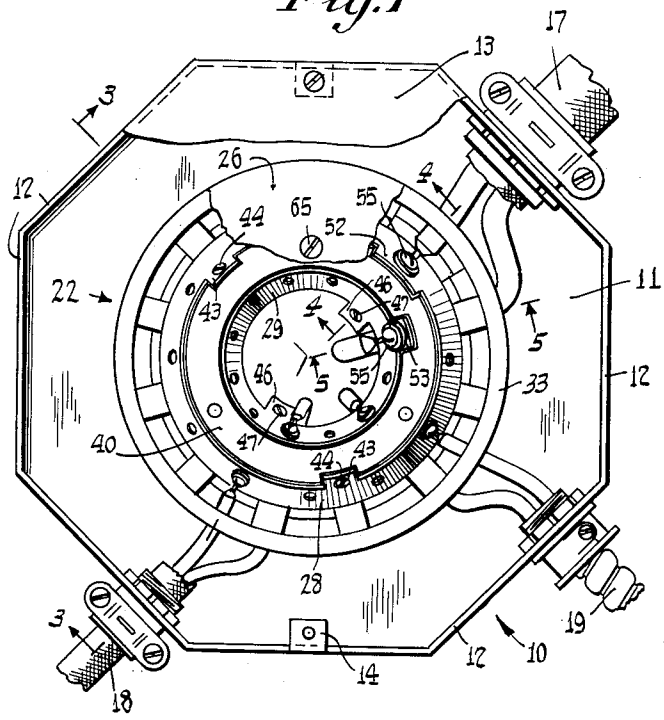


Fig. 2

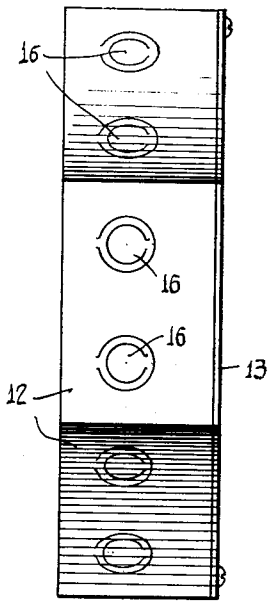


Fig. 3

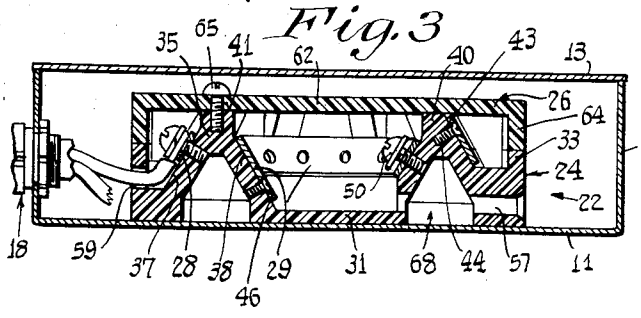


Fig. 4

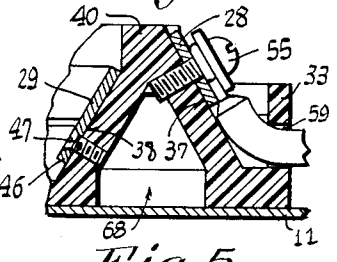


Fig. 5

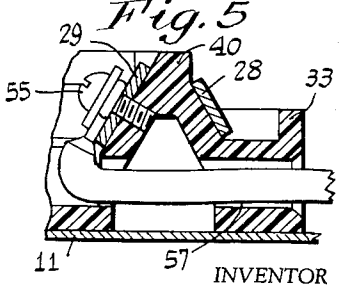
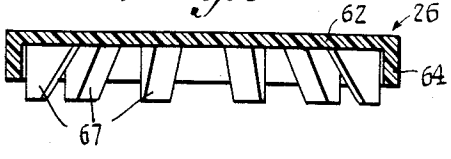


Fig. 6



INVENTOR

Frank J. Schmid

BY H. Gibner Lehmann

AGENT

United States Patent Office 3,014,086 Patented Dec. 19, 1961

3,014,086
ELECTRICAL DISTRIBUTION BOX AND CONNECTOR

Frank J. Schmid, Box W, Newtown, Conn.
Filed Apr. 28, 1959, Ser. No. 809,419
14 Claims. (Cl. 174—59)

This invention relates to electrical distribution or junction boxes, and more particularly to plural-circuit distribution connector devices by which a plurality of branch circuits may be connected to a single, large-capacity feeder circuit.

An object of the invention is to provide a novel and improved plural-circuit electrical distribution connector device by which a comparatively large number of branch circuits may be readily connected to a centrally located termination of a single, heavy feed line or circuit, thereby to enable a plurality of service outlets to be supplied from a centralized point.

Another object of the invention is to provide an improved distribution connector device as above set forth, which may be easily and quickly connected with the branch and feed-line circuits by relatively unskilled personnel.

An additional object of the invention is to provide an improved distribution connector box which is of high efficiency, and is effective in coupling the various circuits with each other whereby permanent, low-resistance connections are secured, which are capable of carrying large currents.

A further object of the invention is to provide an improved connector device as above characterized, which is simple in its construction and which employs relatively few components of the type easily fabricated and assembled.

Still another object of the invention is to provide an improved connector device and distribution box of the type set forth, which may be readily installed with a minimum of difficulty as compared with conventional junction boxes.

An additional object of the invention is to provide a simple and easily installed connector device and distribution box, which is at the same time completely reliable and safe in its operation.

A feature of the invention resides in the provision of an improved screw-terminal type distribution connector device, wherein the terminals are completely doubly enclosed and safeguarded.

Another feature of the invention resides in the provision of an improved distribution-type connector device which is sturdy and rugged in its construction, and not likely to give trouble or require servicing after it has been put into use.

Yet another object of the invention is to provide an improved distribution box and connector device having all of the above features and advantages, and which is nevertheless economical to fabricate and produce.

Other features and advantages will hereinafter appear.

In the drawings accompanying this specification, similar characters of reference are used to designate like components throughout the several views, in which:

FIGURE 1 is a top plan view of the electrical distribution box and connector device of the invention, shown with portions of the cover plates removed to reveal interior details.

FIG. 2 is a side elevational view of the distribution box.

FIG. 3 is a sectional view of the box, taken on the line 3—3 of FIG. 1.

FIG. 4 is a fragmentary sectional view, taken on the line 4—4 of FIG. 1.

FIG. 5 is a fragmentary sectional view, taken on the line 5—5 of FIG. 1.

FIG. 6 is a diametric section of the insulating cover provided for the insulating base member of the box.

Referring to FIGS. 1 and 3, the distribution box and connector device as illustrated therein comprises a metal conduit box or casing indicated generally by the numeral **10**, said box being of a usual construction having a flat bottom wall **11**, side walls **12** and a removable flat cover **13**, the latter being secured in the usual manner to apertured threaded lugs **14** carried by two of the side walls **12**.

As seen in FIG. 2, the conduit box or casing **10** is fabricated with a number of knock-outs **16** in the side walls **12**, to provide for entrance of the main feed line **17** and also branch lines or circuits **18** and **19**. As seen in FIG. 1, the branch circuit **18** is of the sheathed cable type, whereas the branch circuit **19** is of the armored cable or BX cable type.

Within the conduit box or casing **10** there is provided a novel plural-circuit electrical distribution connector device indicated generally by the numeral **22**, the said device having a simple and advantageous organization by which the heavy feed line **17** may be quickly, safely and reliably connected to a large number of branch circuits such as the circuits **18** and **19** shown in FIGURE 1. In the specific embodiment of the invention illustrated herein up to ten branch circuits may be brought into the conduit box **10** and connected to receive energy from the single heavy feed line **17**. However, it should be understood that the invention is not limited to this specific maximum number of branch circuits, since obviously it is capable of modification to adapt it to different requirements.

In accordance with the invention the connector device **22** comprises essentially a squat block **24** of insulating material which, in the illustrated embodiment of the invention, cooperates with an insulating cover **26** to effect a complete enclosure therewith. The connector device further comprises a plurality of novel, concentrically disposed connector rings **28** and **29** located one within the other, the ring **29** being disposed inside of the ring **28** and both rings being located on the base **24** essentially at the same level. The terminal rings are secured to an upwardly extending annular rib or anchorage portion of the base **24**, and have terminal screws or the equivalent, while the base **24** is provided with special passages or channels extending inward from its periphery to accommodate wires which are brought into the casing **10** and which are to be connected to the terminal rings.

Considering now specifically FIGS. 1 and 3, the insulating block or base **24** is seen to comprise a shallow cup having a flat circular bottom **31**, a relatively low cylindrical peripheral wall **33**, and within the wall **33** an upstanding or raised annular rib **35**.

In accordance with the invention the annular rib or anchorage **35** is roughly of triangular cross section, said rib having a broad base, convergent outer and inner side walls **37** and **38**, and a flat, squared top portion **40** presenting a flat, circular top surface **41**. The annular rib or anchorage **35** is spaced inward from the cylindrical side walls **33**, as shown in FIG. 3.

Carried by the rib or anchorage **35** are the two circular, ring-shaped terminal rings **28** and **29**, said rings in accordance with the invention being disposed edgewise with respect to the bottom wall **31** of the base and having a novel frusto-conical configuration as shown. The outer ring **28** has a pair of upwardly extending lugs **43** through which screws **44** pass, the said screws being threaded into the anchorage **35** to secure the outer ring **28** thereto. The inner terminal ring **29** has a pair of downwardly extending lugs **46**, receiving screws **47** which are also threaded into the anchorage **35** to secure the inner terminal ring **29** thereto.

The terminal rings **28** and **29** may be fabricated in any

suitable manner, as from formed strip stock, drawn sheet metal, or the like. The rings may also be made of cast metal, as will be understood.

Each of the terminal rings 28, 29 has a plurality of terminals, shown as being in the form of binding screws 50 which are threaded into the rings and have suitable washers for securing the wires of branch circuits to the rings. Also, the rings 28 and 29 have upwardly extending lugs 52 and 53 respectively, into which heavier binding screws 55 are threaded, for the purpose of securing the heavier or thicker wires of the main feed line 17 to the terminal rings (see FIGS. 4 and 5).

In accordance with the present invention, the insulating block or base 24 is provided with a plurality of inwardly extending passages or channels for admitting the individual wires of the branch circuits and also the main feed line or circuit. Referring to FIG. 3, for the purpose of bringing such wires to the inner terminal ring 29 passages or channels 57 are provided, located below the plane of the inner and outer terminal rings 28, 29 and extending from the outside surface of the cylindrical wall 33 to the inner hollow area encircled by the annular rib or anchorage 35. In staggered relation to the passages 57 there are further provided openings or channels 59 in the cylindrical wall 33, for bringing other wires of the branch and main feed circuits to the outer terminal ring 28.

It will be understood that the wires which are brought in through the channels 57 pass under both of the terminal rings 28, 29 whereas the wires which are brought through the channels 59 do not pass under any of the terminal rings.

By virtue of the upwardly extending lugs 52 and 53 providing added width to the terminal rings 28 and 29 respectively, larger or heavier binding screws 55 shown in FIGS. 4 and 5 may be provided thereon to accommodate the much heavier wire of the main feed line 17, and this is an advantageous feature of the invention, whereas the relatively smaller wires of the branch circuits may be readily accommodated by the smaller binding screws 50 shown in FIG. 3.

The cover 26 which is cooperable with the base 24 is in the form of a shallow inverted cup, the said cover having a flat circular top wall 62 and a depending peripheral flange or wall 64, the latter being arranged to abut the cylindrical wall 33 of the block or base 24. As shown in FIG. 3, the top wall 62 of the cover 26 is apertured to receive fastening screws 65, which are threaded into the squared upper portion 40 of the anchorage or rib 35 to fasten the cover in place. As seen in FIG. 6, the cover 26 may be provided with a plurality of tapered, truncated depending lugs or partitions 67, which serve to position the cover on the wall 33 and which also extend between the terminal screws. It will be seen that the base 24 and the cover 26 constitute a complete enclosure for the terminal rings and binding screws by which the connections are effected between the branch circuits and the main line, and also that the casing or conduit box 10 constitutes a second complete enclosure whereby double protection is had for the terminal rings and screws. The underside of the block or base 24 may be cored or hollowed out as indicated at 68, to reduce the amount of material required in its fabrication.

It will now be understood from the foregoing that I have provided a novel and improved, plural-circuit electrical distribution connector device and box by which a large number of branch circuits may be connected to a feedline brought to a centralized location. The said connector device is seen to be extremely simple, and to comprise relatively few parts or components of simple construction, and is sturdy and reliable in its operation. The opposite sides of each circuit or line are at all times securely insulated from each other, and the required connections may be easily and quickly effected without requiring soldering, taping, pig-tail connectors or the like. Moreover, low resistance contacts are established for all of the circuits, the said contacts being of a permanent nature without reliance being placed on soldering. The circuit device is simple to install and to wire, and this may be readily done by unskilled personnel having but little training. By virtue of its simplicity and few parts, it may be economically manufactured and fabricated.

Variations and modifications may be made within the scope of the claims, and portions of the improvements may be used without others.

I claim:

1. A plural-circuit electrical distribution connector device adapted to be mounted within an electrical conduit box, comprising a squat block of insulating material constituting a base; a pair of inner and outer electrically conducting terminal rings located one within the other on the base, said rings being disposed substantially parallel to the plane of the base and at substantially the same level thereon; and terminals projecting from and carried by said rings, said base having channels extending inward from its outer edge, certain of said channels extending under and being spaced from the outer terminal ring to accommodate wires which are to be connected to the inner terminal ring, said block having wall portions separating the said certain channels from the outer terminal ring, said block further having peripheral wall portions defining said outer edge, through which all of the channels pass, the channels other than said certain channels being disposed wholly beyond the outside of said outer ring and said base having a central bottom wall spaced from and below the inner ring, and above which portions of the said certain channels leading to the inner ring are disposed, said bottom wall being adapted to effect an isolation of the inner ring from the bottom of the conduit box.

2. The invention as defined in claim 1, in which the rings are set on edge, and in which the base has upstanding portions extending between the rings, to which the latter are secured.

3. The invention as defined in claim 2, in which the rings have a frusto-conical shape, and in which the said terminals extend angularly upward with respect to the plane of the base.

4. The invention as defined in claim 3, in which the upstanding portions of the base comprise an annular upstanding rib, and in which the terminal rings are fastened to the said annular rib.

5. The invention as defined in claim 3, in which the inner ring has an upwardly extending lug providing the ring with added width, one of the said terminals being disposed on the ring portion of the added width.

6. The invention as defined in claim 3, in which both rings have upwardly extending lugs providing added width, two of said terminals being disposed on the ring portions of added width and being heavier than the remaining terminals.

7. The invention as defined in claim 1, in which the base is disk-like and has an annular raised rib, and in which the terminal rings are disposed on opposite sides of the said rib, the said certain channels of the base extending under the rib.

8. The invention as defined in claim 7, in which the rings are set on edge, and in which the inner ring has downwardly extending lugs attached to the raised rib, to anchor the ring.

9. The invention as defined in claim 7, in which the rings are set on edge, and in which the outer ring has upwardly extending lugs secured to the annular rib, to anchor the said ring.

10. A plural-circuit electrical distribution connector device adapted to be mounted within an electrical conduit box, comprising a squat block of insulating material constituting a base; a pair of inner and outer electrically conductive terminal rings located one within the other on the base, said rings being disposed substantially

parallel to the plane of the base and at substantially the same level thereon; and terminals projecting from and carried by said rings, said base having channels extending inward from its outer edge, certain of said channels extending under and being spaced from the outer terminal ring to accommodate wires which are to be connected to the inner terminal ring, said base being disc-like and in the form of a shallow cup, and having an annular raised rib, said terminal rings being disposed on opposite sides of said rib, the said certain channels of the base extending under the rib; and a disc-like cover disposed over the base and fastened to the same.

11. A plural-circuit electrical distribution connector device adapted to be mounted within an electrical conduit box, comprising a squat block of insulating material constituting a base; a pair of inner and outer electrically conductive terminal rings located one within the other on the base, said rings being disposed substantially parallel to the plane of the base and at substantially the same level thereon; and terminals projecting from and carried by said rings, said base having channels extending inward from its outer edge, certain of said channels extending under and being spaced from the outer terminal ring to accommodate wires which are to be connected to the inner terminal ring, said base being in the form of a shallow cup and the remaining channels of the base being disposed in the outside peripheral walls to accommodate wires which are to be connected to the outer terminal ring.

12. The invention as defined in claim 11, in which the base is generally round, and in which the channels are staggered on the periphery of the base.

13. A plural-circuit electrical distribution connector device adapted to be mounted within an electrical conduit box, comprising a squat block of insulating material constituting a base; a pair of inner and outer electrically conductive terminal rings located one within the other on the base, said rings being disposed substantially parallel to the plane of the base and at substantially the same level thereon; and terminals projecting from and carried by said rings, said base having channels extending inward from its outer edge, certain of said channels extending under and being spaced from the outer terminal ring to accommodate wires which are to be connected to the inner terminal ring, said base being in the form of a shallow cup and having an annular upstanding rib thereon, spaced inward from the peripheral wall of the cup and carrying the said terminal rings, some of the said channels intended to carry wires to the outer terminal ring being disposed wholly in said peripheral wall of the cup.

14. The invention as defined in claim 13, in which the annular rib is generally of triangular cross section, and in which the rings are set on edge and have frusto-conical configurations, said rings being secured to the said annular rib.

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