United States Patent [19]

Vaughan et al.

[11] **3,717,840**

[45] **Feb. 20, 1973**

[54] ELECTRICAL CIRCUIT CONNECTION

[75] Inventors: **William Lee Vaughan,** Concord; **Basil Graeme-Noel,** Wellesley, both of Mass.

[73] Assignee: **N.V. Inc.,** Concord, Mass.

[22] Filed: **Feb. 3, 1971**

[21] Appl. No.: **112,324**

[52] **U.S. Cl.** .....**339/198 R,** 339/19, 339/95 D, 339/207

[51] **Int. Cl.** **H01r 9/00**

[58] **Field of Search**.....339/198, 19, 36, 39, 95 D, 339/207, 208, 210; 174/59

[56] **References Cited**

UNITED STATES PATENTS

3,373,398	3/1968	Kolinskie	339/198
3,146,050	8/1964	Kozien et al.	339/198 R
3,005,180	10/1961	Dreher	339/198 R
3,189,866	6/1965	Lazar et al.	339/198 P
2,884,613	4/1959	Chandler et al.	339/198 H
3,602,871	8/1971	Newman	339/22 B

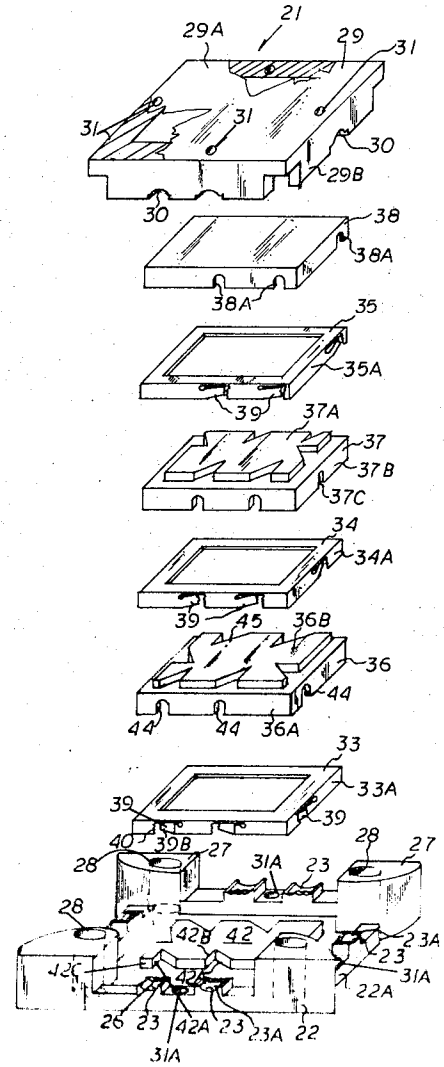
Primary Examiner—Robert L. Wolfe
Assistant Examiner—Robert A. Hafer
Attorney—Philip G. Hilbert

[57] **ABSTRACT**

This disclosure is directed to an elastic circuit connector comprising a plurality of stacked alternately spaced conducting and non-conducting elements to define a terminal block interposed between complementary housing members. The conducting elements of the terminal block are formed with a flange portion having blanked therefrom a locking tongue to form a screwless electrical connection between a conducting wire and an electrical element. The arrangement is such that the connecting wires of like circuits are coplannarily connected. The complementary housing member includes an opening formed therein to frictionally secure the enclosing sheath of a conducting wire or the like in the assembled position.

It is also contemplated that the housing may include an outlet in the nature of a plug socket or toggle switch having contacts complementing a quick connect control formed integral to the conducting element of the terminal block.

18 Claims, 16 Drawing Figures



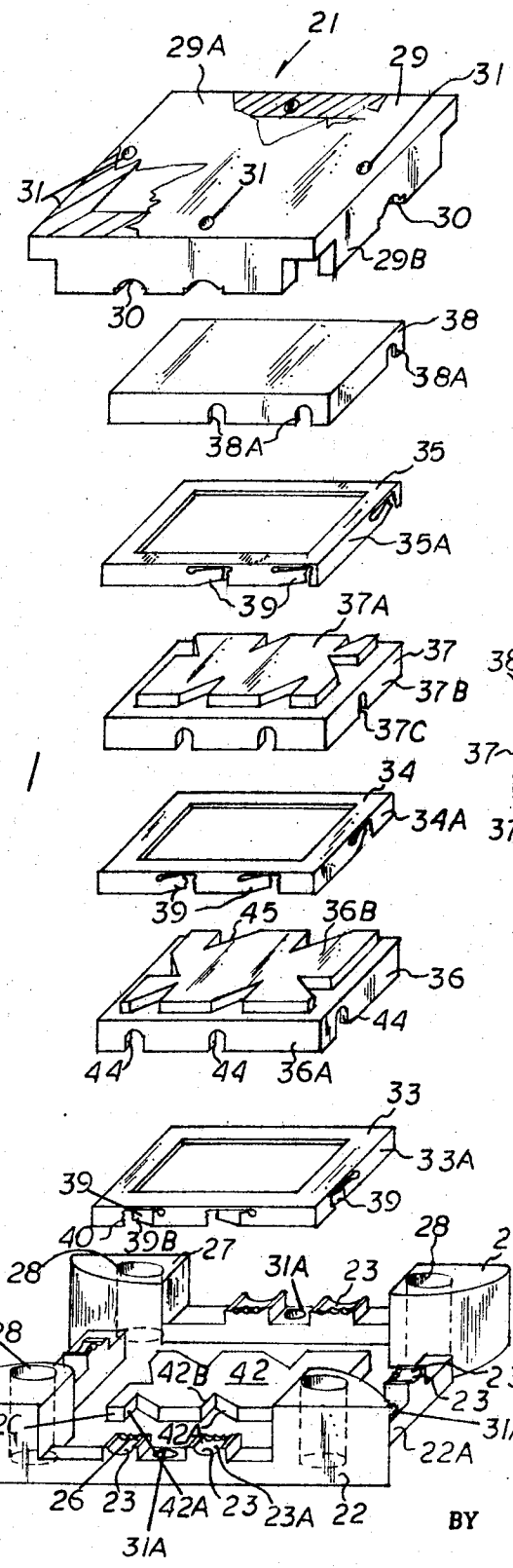


FIG. 1

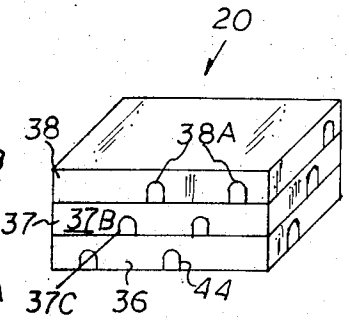


FIG. 1A

INVENTORS
William Lee Vaughan
Basil Graeme Noel
BY
Philip S. Hilbert
ATTORNEY

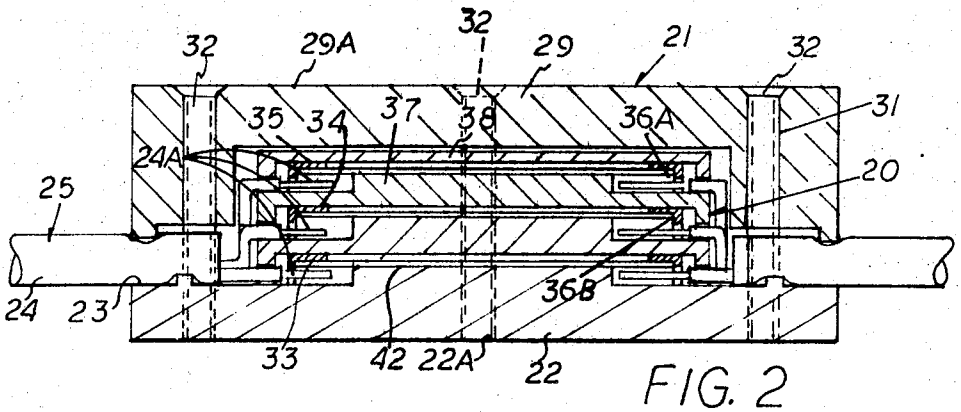


FIG. 2

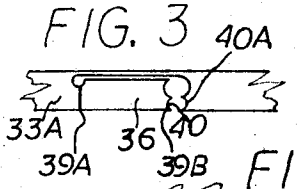


FIG. 3

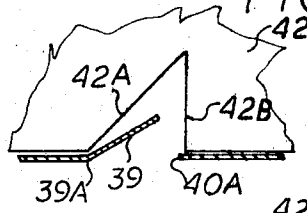


FIG. 4

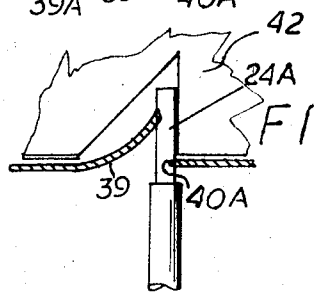


FIG. 5

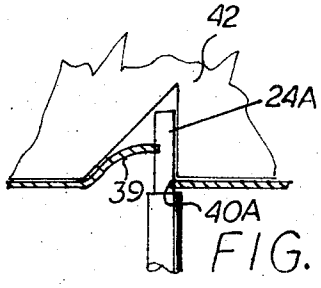


FIG. 6

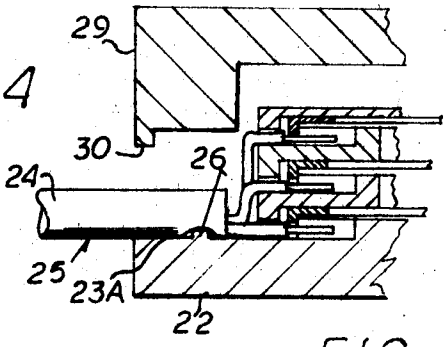


FIG. 7

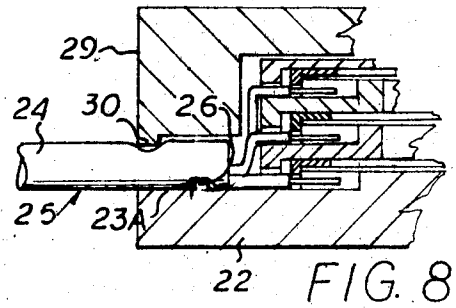


FIG. 8

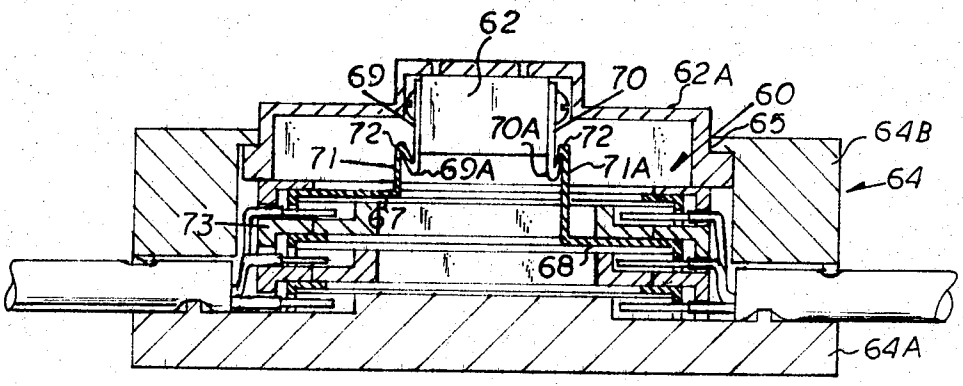
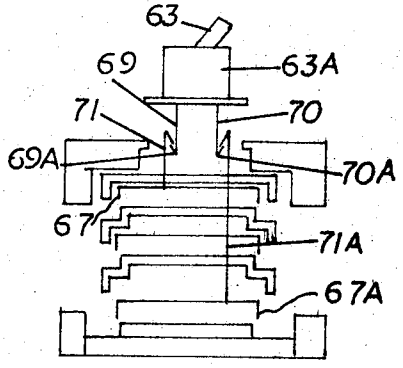


FIG. 11

FIG. 12



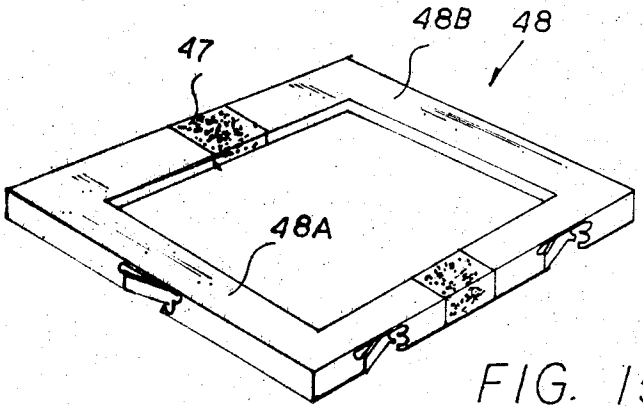


FIG. 15

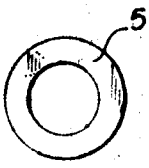


FIG. 10A

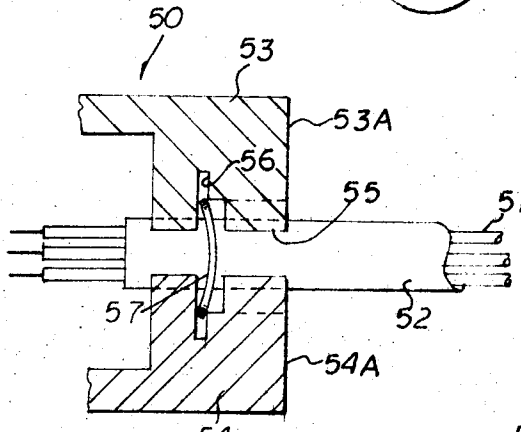


FIG. 9

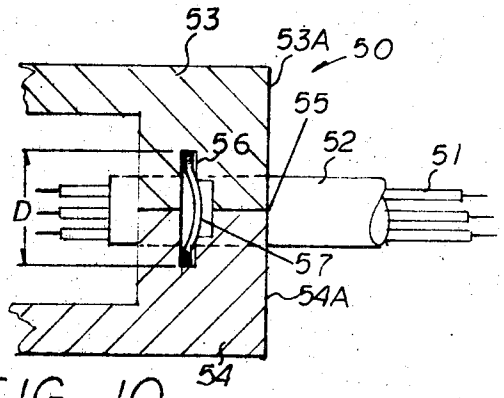


FIG. 10

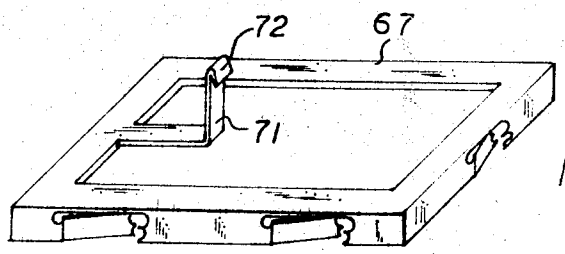


FIG. 13

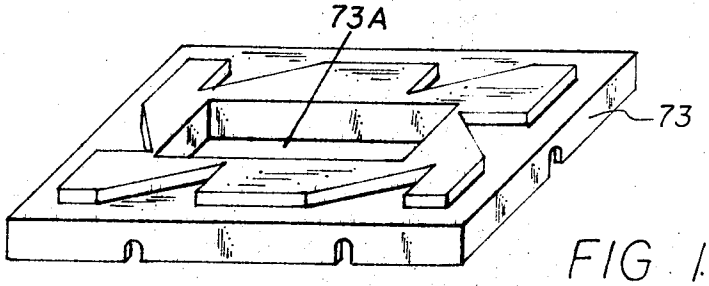


FIG. 14

ELECTRICAL CIRCUIT CONNECTION

PROBLEMS AND PRIOR ART

Heretofore junction boxes, terminal boxes and the like for making electrical connections generally in current use comprise a metallic box having a plurality of openings through which the end of a connecting wire or cable is inserted. Because most wires used in wiring house circuits and the like are encased in either a rigid or non-rigid sheathing, a connector, ferrule or clamp was generally employed to firmly secure the cable or wire sheathing to the terminal box to resist any pulling force being exerted on the cable or wire. With the cable or sheathing thus secured the stripped ends of the individual wires were then electrically connected by twisting the wire ends together as required to make a given circuit and securing the ends so joined by solderless connector. Electrical connections so made, even by experienced electricians, required considerable time because of the various manual operations required. For this reason the number of connections which a given electrician can make in a given period of time is limited. As a result of the high labor cost of electrical technicians, the cost and expense in wiring circuits in many instances can reach prohibitive limits.

In the event an incorrect installation is made when such metallic terminal boxes are used which causes the conductor wire to make contact with the box, a highly dangerous problem of shorting, overheating and/or fire may result. Because such terminal boxes are generally hidden in the wall of a structure, such faulty installation can not be readily detected until the damage has been done.

Another problem which can result with metallic boxes occurs when an aged insulation on a conductor cracks or frays. When this occurs the metal box can heat up causing fire and/or electrical shocks or shorts. Also the use of metal boxes as a junction or terminal box presents a hazard to installers and/or electricians in the event power to the wire connected therein is not cut off.

OBJECTS

An object of this invention resides in the provision of a terminal or junction box constructed so that the stripped ends of a conducting wire can be simply inserted into an opening formed therein to form an electrical connection which is frictionally retained therein.

Another object resides in the provision of a junction box constructed of stacked alternately spaced conducting and non-conducting elements in which wires of like circuits are connected in a common plane to the respective conducting element.

Another object resides in the provision of a junction box or the like having a plurality of spaced apart electrically insulated conducting members constructed to frictionally secure and lock a plurality of conducting wires in electrical circuit.

Another object is to provide the maximum safety possible from electrical shock or fire during and after installation by electrically isolating all conductors by the use of non-conducting and non-burning materials.

Another object is the prevention of frayed conductor insulation or frayed cable insulation causing conductors to short out.

Another object is to prevent the installer from receiving electrical shock even if the power is accidentally left on at the box.

Another object is to prevent conductors or ground circuits from becoming loosened.

Another object is the prevention of excessive cable clamping action to crush conductors and cause the box to become hot.

Another object is to prevent the inserting of conductors into the ground circuit.

Another object is to provide a junction or terminal box or the like having a housing for securely clamping the sheath of the conducting wires in the operative position.

Another object is to provide an electrical receptacle or switch box in which the receptacle or switch is readily connected in contact to the connecting wires in a relatively simple and expedient manner.

Another object is to provide a junction box, switch box or outlet box with a terminal block in which the conducting wires and/or an electrical receptacle switch or appliance can be readily secured or connected in electrical circuit in a simple and expedient manner.

Another object of this invention resides in the provision of an electrical terminal block having improved friction locking tongues for locking conductor wires in electrical circuit.

BRIEF SUMMARY OF THE INVENTION

The foregoing objects and other features and advantages are attained by a junction box or terminal box comprising of a plurality of alternately spaced conducting and non-conducting elements in the form of plates stacked one on the other to form a terminal block. Spaced about the sides of the block thus formed are openings for receiving the stripped ends of a conducting wire. Disposed in alignment with the openings are flange portions of the conducting elements in which a locking tongue is blanked out of the plane thereof and which cooperate with an adjacent edge portion to frictionally grip and lock the stripped wire conductors in electrical circuit with any other conductor similarly connected to a common conducting element. Thus electrical coupling of a plurality of electrical conductors is attained simply by inserting the stripped ends of a wire through an opening formed in the block. The opening for receiving and locking the respective wires of a particular cable are spaced so that wires of like circuits are connected to a co-plannar conducting element.

The terminal box is arranged to be disposed within a housing comprising a base member and a complementary cover member which are formed so as to define an opening for receiving the sheath in which conducting wires are encased. The arrangement is such that in the operative position the housing members co-act to frictionally secure the sheath of a wire cable therebetween in a manner to resist any force or pull thereon. The housing members are constructed so as to frictionally lock or secure either a rigid and/or non-rigid sheath.

In the event the terminal block described is to be used as a junction for receiving a receptacle, e.g., an outlet socket, switch and the like, the conducting elements and the complementary contacts of the receptacle are formed with complementary interlocking con-

tacts whereby the electric connection is made simply by a snap type connection between the corresponding contacts.

FEATURES

A feature of this invention resides in the provision of a terminal block or junction comprising of a plurality of alternating conducting and non-conducting elements alternately stacked one on the other with openings formed therein for frictionally securing the ends of a stripped conducting wire in electrical contact.

Another feature resides in the construction of a terminal block disposed within complementary housing sections constructed to frictionally secure the encasing sheath of a wire conductor with the respective stripped ends of the individual wire conductors frictionally secured and locked in a screwless connection in an electrical circuit.

Another feature resides in the provision of a terminal block formed of stacked electrically insulated conducting elements in which the respective wires of like circuits are electrically connected in a common plane to one of the stacked conducting members.

Another feature resides in a terminal block of insulated stacked conducting elements having contacts arranged to be frictionally coupled to complementary contacts of an electrical appliance, e.g., a switch or outlet receptacle.

Other features and advantages will become more readily apparent when considered in view of the drawings and the detail description thereof in which:

FIG. **1** is a perspective exploded view of an electrical terminal block and housing therefor embodying the present invention.

FIG. **1A** is an assembled perspective view of a terminal block embodying the invention.

FIG. **2** is an assembled cross-sectional view of the terminal block and housing construction of FIG. **1**.

FIG. **3** is an elevation view of a detail of construction of the locking tongue formed on the internal conducting elements of the block construction of the present invention.

FIG. **4** is a plan view of the locking tongue construction of FIG. **3**.

FIG. **5** illustrates a detail of construction illustrating the manner in which a wire conductor is frictionally secured to the conducting element of the terminal block.

FIG. **6** is a view similar to that of FIG. **5** illustrating the manner in which a pull on the wire conductor is resisted by the locking tongue.

FIG. **7** is a detailed sectional view illustrating the manner in which the sheath of a wire cable or the like is disposed between the housing sections of a terminal block of the present invention.

FIG. **8** is a detailed view similar to that of FIG. **7** illustrating the manner in which the sheathing of a wire conductor is secured between the complementary housing sections as the housing sections are assembled.

FIG. **9** illustrates a modified form of the invention in which the housing sections of the terminal block construction are constructed to accommodate a rigid sheath conductor showing the parts in the inoperative position.

FIG. **10** is a view similar to that of FIG. **9** but illustrating the housing sections in the operative locking position on a rigid sheath conductor.

FIG. **10A** is a detail of a rigid sheath locking washer as employed in the construction of FIGS. **9** and **10**.

FIG. **11** illustrates a modified embodiment of the invention illustrating the manner in which an electrical receptacle is disposed in electrical connection with a terminal block embodying the present invention.

FIG. **12** is a schematic illustration illustrating how a switch member may be connected to a terminal block embodying the present invention.

FIG. **13** is a perspective detail of construction of a conducting element of the terminal block of FIGS. **11** or **12**.

FIG. **14** is a perspective view of a detail of construction of the non-conducting element of the terminal block of FIGS. **11** or **12**.

DETAILED SPECIFICATION

Referring to the drawings, there is illustrated in FIGS. **1** and **1A** an electrical distribution center or terminal block construction **20** and housing **21** therefor embodying the present invention. As best seen in FIG. **1**, the terminal block assembly comprises a base housing section **22** and a complementary cover section **29** which, in the assembled position, are adapted to mate with one on the other, for securing therebetween the terminal block **20**. As best seen in FIGS. **1** and **2** the base housing member **22** has a bottom wall **22A** which has formed along the circumferential marginal portion thereof at spaced intervals a means **23** for locating or receiving the sheath portion **24** of a conducting cable **25**. The means **23** for receiving or locating the sheath portion **24** of a conducting cable **25**, as viewed in FIG. **1** comprises an arcuate formed seat **23A** in which a gripping means in the form of gripping teeth **26** are formed integral with the bottom portion of the seat. The corner portions of the base section or member **22** are provided with bosses **27** having an opening **28** formed therein for receiving a fastener by which it can be supported on a wall or stand for vertical or horizontal mounting. Intermediate the respective side walls the base **22** is provided with openings **31A** for receiving fasteners **32**. In the illustrated form of the invention the base member **22** is provided with six seats **23A** by which six conducting cables **25** may be connected in circuit with one another as will be hereinafter described. However, it will be understood that a housing and terminal block embodying the invention may be found with more or less than six cable seats **23A** for receiving cables which may be connected in circuit, if desired.

The cover member **29** of the housing **21** comprises a substantially rectangular member having a top wall **29A** and a depending circumscribing flange portion **29B**. The respective flange portions **29B** are provided with a complementary cut-out or notch **30** to define, in the assembled position thereof, a complementary cable seat which co-acts with cable seats **23A** of the bottom member **22** to secure therebetween a cable sheath as will be hereinafter described.

The cover member **29** is also provided with holes **31** adapted to be disposed in alignment with the tapped openings **31A** formed in the bottom member **22** for

receiving therein a fastener, as for example a screw or bolt 32, by which the housing members 22 and 29 may be secured in assembled position as seen in FIG. 2.

In the assembled position of the housing 21, as seen in FIGS. 7 and 8, the sheath portion 24 enclosing the wire conductors 24A is frictionally secured between the complementary housing members 22 and 29 whereby the clamping force effected by the complementary cable seats 23, 26 and 30 formed in the sides of the housing members 22, 29 cooperate to clamp and frictionally secure the sheath 24 of a wire cable 25 therebetween so as to resist any pulling force applied to the cable.

As best seen in FIGS. 1, 1A and 2, the terminal block construction 20 enclosed between the complementary housing sections 22 and 29 comprises a plurality of alternately stacked electrical conducting elements 33, 34 and 35 and non-conducting elements 36, 37 and 38. In the illustrated form of the invention, the three electric conducting elements 33, 34 and 35, which are substantially similar are alternately stacked between the non-conducting members 36, 37 and 38. The respective conducting members 33, 34 and 35 comprise a metallic plate formed of suitable electrical conducting material, as for example, copper. The conducting elements 33, 34 and 35 are substantially rectangular formed with a circumscribing depending flange 33A, 34A and 35A. In the illustrated form of the invention the central portion of each conducting member 33, 34, 35 may be blanked out to conserve material. The depending flange portions have blanked out of the plane thereof, one or more locking tongues 39. As best seen in FIGS. 3, 4 and 5, the locking tongue 39 of each element 33, 34, 35 is arranged to be hingedly connected along a hinge line 39A so as to be integrally formed as part of the depending flange with the free end 39B of the tongue 39 being slightly tapered so as to terminate in an arcuate or notched edged portion 40. The complementary adjacent edge 40A of the flange is also provided with a notched out arcuate cut-out, as indicated at 40A, whereby the notched-out portion of the tongue and flange are arranged to accommodate and frictionally grip therebetween the stripped end 24A of a conducting wire 24.

In the illustrated form of the invention it is to be noted that two such locking tongues 39 are blanked out of one pair of opposed side portions of the conducting member, and one locking tongue 39 is blanked out of the other opposed pair of sides.

The first or lowermost conducting member 33 of the series of conducting members is arranged so as to be seated over a raised portion or table surface 42 located centrally on the bottom wall 22A of the base housing member 22. AS shown, the raised portion or table surface 42 of the base housing member 22 is integral with the base member and is formed of a suitable dielectric material, as for example, a non-conducting plastic, rubber, Bakelite and the like. The raised or table portion 42 is dimensioned so that the lowermost conducting member 33 may be snuggly fitted thereover. As best seen in FIG. 1 the raised or table portion 42 of the base member 22 is provided with a series of notched-out portions 42A which are arranged in alignment with an associated locking tongue 39 of the resistor or conducting member 33. As noted, the notched-out portions 42A are defined as an angle having one vertical wall 42B and its other wall inclined thereto to define an apex of an acute angle of 30 to 45 degrees. The arrangement is such that the vertical wall 42B of the angled notch 42 is disposed substantially normal to the adjacent edge 40A defined opposite the free end 39B of the associated locking tongue. Thus the edge 42C of the raised portion 42 parallel to the flange 33A of the resistor element seated thereon provides a stop or abuttment which prohibits the flexing of the vertical edge portion 40A which defines with the free end of the locking tongue 39, a wire receiving opening. As will be hereinafter described, the arrangement is such that the edge 40A and the free end 39 of the tongue 39 cooperate to frictionally lock and secure therebetween the stripped end of a wire in electrical connection with the associated conducting element.

Superimposed over the lowermost conducting element 33 is non-conducting member 36. Member 36 is in the form of a rectangular member having a depending flange 36A which, in the assembled position, is adapted to snuggly overly or embrace the depending flanges 33A of conducting member 33. The non-conducting member 36 is formed so that its depending flanges 36A are provided with one or more cut-outs or notches 44 to define an opening. In the assembled position the openings 44 are arranged to be disposed in alignment with the wire opening defined between the free end 39B of the locking tongue 39 and adjacent edge 40A opposite thereto.

The upper surface 36B of non-conducting element 36 is provided with a raised portion having circumferentially spaced thereabout angled notches 45 similar to those formed on the raised portion 42 of the base 22. Preferably the notches 45 formed in non-conducting element 36 are positioned so as to be slightly staggered with respect to the notches 42A formed on the bottom wall 22A of the base member 22. However, if desired the respective notches formed in the raised portions of the non-conducting members may be disposed in vertical alignment.

Superimposed on non-conducting element 36 is a second conducting element 34. Element 34 is substantially similar to element 33, except that the locking tongues 39 of element 34 are blanked so as to be slightly staggered relative to the locking tongues 39 of the lowermost member 33.

For a three wire junction box connector, another non-conducting element 37, similar to that of element 36, is fitted onto the second conducting member 34. Element 37 is also provided with raised portions 37A adapted to receive a third conducting member 35.

In a three wire circuit junction box or terminal 20 the middle conducting member 34 can be made the ground, with the upper and lower conducting members 33 and 35 being available to connect to current carrying conductors to one another electrically.

In the assembled position, the terminal block 20 is contained between the base and cover housing members 22, 29 as seen in FIG. 2. Also the cover members 22 and 29 frictionally maintain the sheath 25 of a wire conductor clamped therebetween. The respective stripped ends of the individual wires 24A of the cable 25 are frictionally connected or coupled in an electrical circuit simply by inserting the stripped end 24A of an

individual wire into an appropriate wire opening **44**, **37C** or **38A** formed in the terminal block.

As best seen in FIGS. **3–5** the co-action between the free end **39B** of the locking tongue **39** and the adjacent edge **40A** of the associated conducting member function to frictionally secure the wire conductor in electrical contact with he associated conducting member. Thus when a pull is applied on the individual wire conductors **24A**, as evidenced in FIG. **6**, the tongue **39** tends to reverse upon itself to frictionally wedge or secure the wire in position between the free end of tongue **39** and the adjacent edge portion **40A** of the element to resist any tendency of the wire being pulled free.

With the junction box thus described it will be apparent that all wires of like circuit are electrically connected to a common co-plannar conducting member. Thus every wire connected to the bottom element **33** of the stacked conductor elements will be electrically connected or coupled together. Likewise all conductors connected to the middle element **34** will be grounded, if this element is made ground, to all other wires connecting thereto. Those conductors or wires connecting to the top member **35** will likewise be connected to like circuits.

If separate circuits are desired, it will be understood that the respective stacked conducting members may be modified, as seen in FIG. **15**, with electrical insulating segments or portions **47** to electrically insulate one section **48A** of an element **48** from another portion **48B** so that connecting wires connected to portions **48A**, **48B** of element **48** may be in different circuits. With the element constructed as viewed in FIG. **15**, wires connected to portion **48A** are electrically connected in like circuits whereas wires connected to the other portion **48B** of the conducting member **48** are connected into a different circuit. Thus with the construction described it will be understood that various circuit combinations may be afforded by varying the arrangement and construction of the respective conducting members such as **33**, **34**, **35** in a manner herein described. It will be understood that the insulating portion **47** of the modified element **48** may be air, e.g., by merely effecting an air space or gap between portions **48A**, **48B**, or any other dielectric material integrally mated with portion **48A**, **48B**, or any other dielectric material integrally mated with portion **48A**, **48B**.

With the terminal box described it will be noted that wires **24A** can be readily joined into electrical circuit with one another simply by inserting stripped ends of the wires in the appropriate wire openings **44**, **37C**, or **38A** formed in the juncture box whereby like wires of like circuits are co-plannarly connected to a given common conducting element. Also the construction of the housing **21** encasing the terminal block **20** is such that the sheath **24** of a cable **25** is firmly secured in position.

FIGS. **9** and **10** illustrate a modified housing construction **50** which is particularly adapted for securing or clamping therebetween cable or wire **51** having a rigid sheath **52**, as for example, a BX cable or metallic encased wires, as in a pipe. In this form of the invention the complementary flange portions **53A**, **54A** of the base and cover housing members **53** and **54** respectively, adjacent the opening **55** defined thereby for receiving the cable sheath **52** are provided with an arcuate groove or notch **56** for receiving or seating a washer **57** through which a cable sheath **55** is inserted. The washer may be slightly bowed or flexed, as seen in FIG. **9**, and the outer diameter of the washer **57**, as best seen in FIGS. **9** and **10**, is such that it is slightly greater than the diameter D of the notch **56** in the assembled position as seen in FIG. **10**. The washer **57** is also made of a resilient or readily flexing material which is free to flex when the respective housing sections **53**, **54** are drawn together to assembled position as viewed in FIG. **10**. The arrangement is such that when the respective housing sections **53**, **54** of the modified embodiment, as seen in FIGS. **9** and **10**, are drawn together, the washer **57** will be flexed causing the inner circumference thereof to grip or bind the rigid sheath **52**, of the cable between opposed portions of the inner circumference to impart a clamping or securing force to the end of the rigid sheath cable. Thus the arrangement, as seen in FIG. **10**, is such that the flexed washer **57**, when compressed between the respective complementary housing member **53**, **54** is such that it will tend to resist a pull on the sheath tending to separate it from the housing **50**. The terminal block construction (not shown) disposed within the housing **50** of the modified embodiment of FIGS. **9** and **10** is similar to that described with respect to FIGS. **1** and **1A**, and therefore need not be further described.

FIG. **11** illustrates another modified embodiment **60** of the invention wherein the terminal block **61** is constructed and arranged so that an electrical appliance, as for example, a receptacle outlet **62**, or switch means **63**, may be quickly and easily attached to the contacts of the junction block **61** by a screwless connection. As shown in FIG. **11** the housing **64** for the terminal block **60** comprises a bottom member **64A** which is similar to the bottom member hereinbefore described with respect to FIG. **1**. The cover member **64B** of the housing **64** is similar to that described with respect to FIG. **1**, with the exception that the central portion of the housing is provided with a cut-out **65** sized to receive a receptacle or switch housing **62A** or **63A**.

The terminal block construction **60** of FIG. **11** is similar to that described with respect to FIG. **1** with the exception that those conducting members, e.g., **67** and **68** or **67A**, which are utilized to conduct the circuit to the contacts **69**, **70** of the connected receptacle outlet **62** or switch **63** are provided with integrally formed spring leaf contacts **71** or **71A** which are bent out of the respective planes of members **67** or **68** as seen in FIGS. **11** and **13**. The respective leaf contacts **71**, **71A** are each provided with a reversely bent or hook-shaped end portion **72** on the free end thereof.

The electrical contacts **69** and **70** of the receptacle **62** or switch **63** are likewise provided with a depending spring finger having a reversely bent complementary hook end portion **69A**, **70A** adapted to mate or hook up with the hook ends **72**, **72** of the conducting plate leaf contacts **71**, **71A**. As best seen in FIGS. **11** and **12**, electrical contact between the contacts **69** and **70** of the receptacle **62** or switch **63**, and the leaf contacts **71**, **71A** of the respective conducting member is effected simply by interhooking the hook ends thereof. With this construction it will be noted that a screwless connection is thus formed between the contacts **69**, **70** of the outlet **62** or switch **63** and the leaf contact **71**,

71A of the appropriate conducting members carrying the circuit thereto.

FIG. 13 illustrates a perspective detail of a conducting element 67 adapted for use as a terminal block adapted for use for connection with a receptacle outlet 62 or switch 63. The respective contacting members may be provided with the appropriate appliance, as for example a plug or switch to complete the required circuit. With the construction of FIGS. 11 and 12, the non-conducting member of the terminal block 60, e.g., member 73, is provided with a central cut-out portion 73A to provide an opening through which the leaf contacts 71, or 71A of the subjacent conducting element may extend.

In all other respects the construction of the modified junction assembly of FIGS. 11 and 12 is similar to that described with respect to FIGS. 1 and 1A.

FIG. 12 illustrates a schematic view similar to that of FIG. 11 but modified to illustrate a switch means 63 connected in circuit instead of an outlet receptacle 62. Otherwise the construction of the embodiment of FIG. 12 is similar to that of FIG. 11.

From the foregoing it will be noted that the terminal block construction comprises a readily simple and inexpensive device in which one or more wires may be connected in circuit in a simple and expedient manner simply by inserting the stripped ends of a connected wire through the appropriate opening formed therein, whereby the wires of the like circuit are connected to a common conducting member with a screwless connection. With the construction described, all wires connected into a particular layer, or conducting member are connected in circuit with one another, unless the particular conducting member, e.g., member 48 is electrically segmented as described with respect to FIG. 15. The terminal blocks, as described, greatly facilitate and reduce the amount of time otherwise required to make electrical connections utilizing conventionally known junction boxes. Also it will be apparent that the various circuits which can be wired by conventional means can be attained by the terminal blocks of the present invention by appropriate selection of the appropriate block necessary for a given installation as herein described. The construction is such that when a terminal block, as described, is utilized within a housing construction as described, the arrangement is such that the cable enclosing the conducting wires is securely clamped between the complementary sections of the housing to resist any pulling force applied thereto. In addition, the individual wires connected in electrical circuit are likewise frictionally secured within the terminal box to further resist any force or pull exerted on the respective wires. In this manner a very positive holding force is attained to resist any pull imparted on the wires connected in circuit.

The invention described is directed to a junction and/or outlet construction or a combination thereof having a conductor pate and/or ground plate internally of the unit. The described construction is applicable for use with electrical-mechanical switches, electrical-mechanical panels, sub-panels, fuse boxes, switchboards, connectors, coils, plugs, control boxes, brakes, clutches, junction boxes, terminal boxes, and in general to any wiring application of electrical conductors.

While the present invention has been described with respect to particular embodiments thereof it will be readily understood that variations and modifications may be made without departing from the spirit or scope of the invention.

What is claimed Is:

1. A terminal block comprising:
- a plurality of stacked alternately spaced layers of conducting and non-conducting elements whereby the latter electrically insulate the former from one another,
- complementary means formed on the adjacent layers of said conducting and non-conducting elements for receiving and frictionally securing the ends of a conducting wire in electrical connection with the conducting element so that wires of like circuit are co-plannarily electrically connected, and
- means for securing said elements in their respective stacked positions,
- where each conducting element includes a plate member having a connected circumscribing flange angularly disposed relative to the plane of said plate member,
- and said complementary means including flexible locking tongue blanked out of a portion of said flange.

2. A terminal block comprising:
- a plurality of stacked alternately spaced layers of conducting and non-conducting elements whereby the latter electrically insulate the former from one another,
- complementary means formed on the adjacent layers of said conducting and non-conducting elements for receiving and frictionally securing the ends of a conducting wire in electrical connection with the conducting element so that wires of like circuit are co-plannarily electrically connected, and
- means for securing said elements in their respective stacked positions,
- each of said conducting layers includes a flange portion,
- and said complementary means includes a locking tongue blanked out of a portion of said flange whereby said tongue is hingedly connected and adapted to flex inwardly of said block for receiving the end of a wire conductor.

3. A terminal block as defined in claim 2 wherein said locking tongue has its free end formed with a notched-out portion adapted to frictionally engage the end portion of a conducting wire, and the adjacent portion of said flange from whence said tongue
- has been blanked having a complementary notched-out portion whereby said notched end of said tongue and notched adjacent portion of said flange cooperate to frictionally secure a wire conductor therebetween.

4. A terminal block as described in claim 2 wherein said non-conducting element is formed in an opening therein for receiving the end of an electrical conducting wire,
- said opening being disposed in substantial alignment with the spacing defined between the free end of said locking tongue and adjacent portion of said flange from whence said tongue is blanked.

5. A terminal block as defined in claim 4 wherein the location of the spacing defined between the locking tongue and adjacent end portions of the respective layers of said conducting elements and the complementary aligned opening formed in the non-conducting elements are staggered.

6. A terminal block as defined in claim 4 wherein said non-conducting element includes a complementary notch associated with the locking tongue of an adjacent conducting member to limit the insertion of a conducting wire into said block.

7. A terminal block as defined in claim 2 including at least two spaced apart layers of conducting elements.

8. A terminal block as defined in claim 2 including three spaced apart layers of conducting elements.

9. A terminal block as defined in claim 2 and including means for electrically insulating a portion of one of said conducting elements from another portion of the same element.

10. A terminal block as defined in claim 2 wherein each said conducting element is defined an an endless member having flanged portions.

11. A terminal block as defined in claim 2 wherein each said conducting element includes a connector tab means blanked out of said element, and

an outlet means having complementary connecting tab contact means adapted to make electrical contact with said connector tab means.

12. The invention as defined in claim 11 wherein said outlet comprises a plug outlet.

13. The invention as defined in claim 12 wherein said outlet comprises a switch outlet.

14. The invention as defined in claim 2 and including a housing for encasing said terminal block,

said housing including a cover member and a complementary base member,

said cover member and base member having complementary portions defining an opening for receiving a sheathed cable or circuit conducting wires,

sheath securing means operatively associated with said defined opening to securely grip the sheath of said cable therebetween in the assembled position,

and means for securing said housing members in the assembled position.

15. The invention as defined in claim 14 wherein said sheath securing means includes integrally formed grippers formed on at least one of said housing members.

16. The invention as defined in claim 14 wherein said sheath securing means includes:

means defining complementary aligned recessed portions formed in said housing members adjacent the opening defined therein,

a resilient washer adapted to receive the sheathed cable deposed between the aligned recessed portion of said housing member,

said washer having a diameter slightly greater than the width of said recessed portion in the assembled position of said housing member whereby the compression imparted to said washer in the assembled position of said housing members permits a flexing of said washer that results in frictionally securing the sheathed cable between said housing members.

17. An electrical circuit connector comprising: a housing including a base member and a complementary cover member,

said base member and cover member having complementary portions defining an opening for receiving a cable comprising of a plurality of circuit defining wires,

means operatively associated with said defined openings to lock said cable between said members in the assembled positions thereof,

means defining a terminal block interposed between said base member and cover member,

said block including a plurality of conducting layers, and a non-conducting layer interposed between adjacent conducting layers wherein said conducting planes are disposed in spaced apart planes,

means formed in each of said conducting layers for frictionally locking the ends of a conducting wire in electrical contact therewith so that wires of like circuits are co-plannarily connected,

and means for securing said housing members together for encasing said laminated block therebetween.

18. The invention as defined in claim 17 wherein said cover member is provided with a cut-out opening,

and an outlet adapted to be received within said cut-out opening,

and complementary contacts connecting conducting layers of said terminal block to said outlet,

and said complementary contacts having quick connecting coupling means for making electrical contact therebetween.

* * * * *