

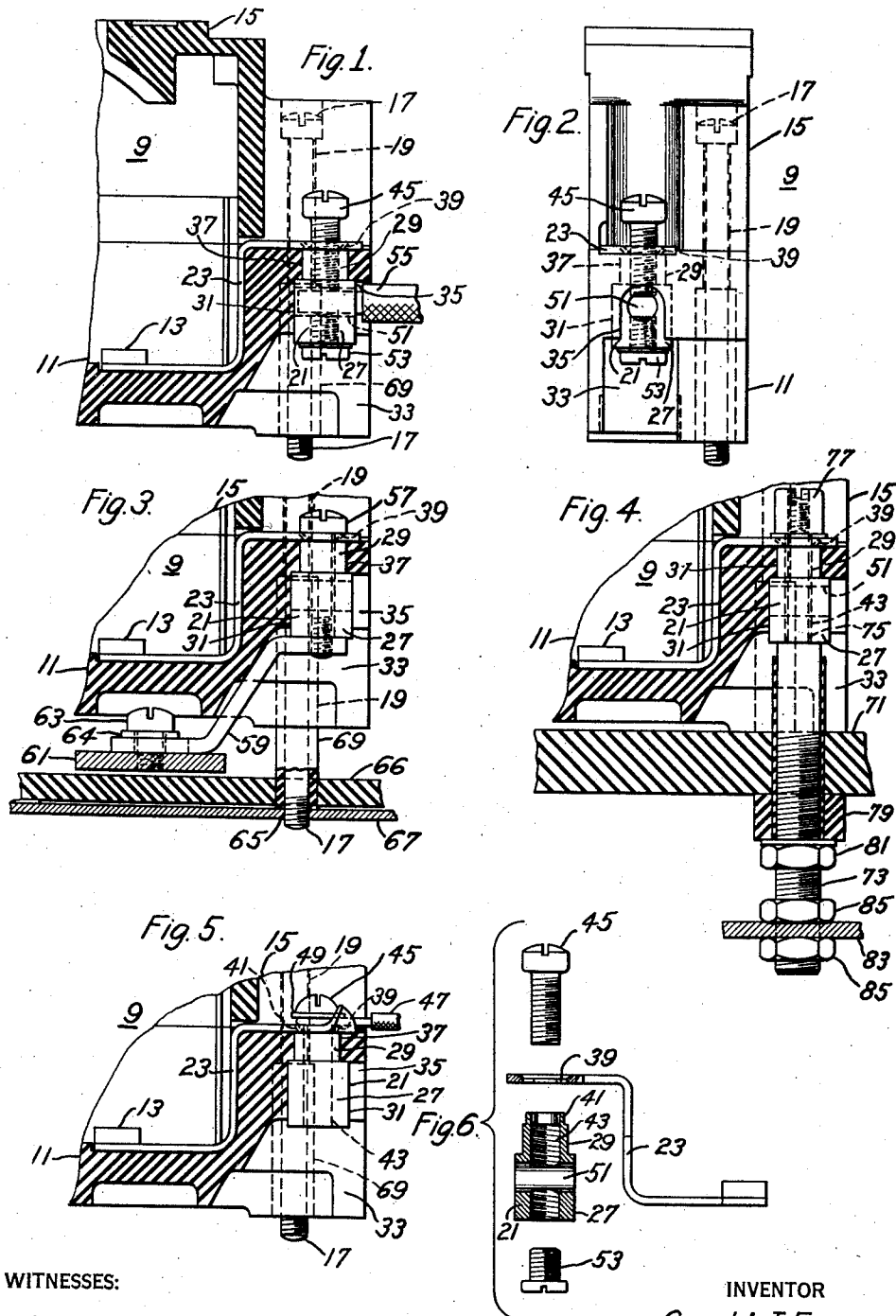
May 7, 1940.

G. J. FREESE  
CIRCUIT BREAKER

2,199,626

Filed Oct. 21, 1936

2 Sheets-Sheet 1



WITNESSES:

*Wm. B. Sellers.*  
*Y. S. Parker*

INVENTOR

*Gerald J. Freese.*

BY  
*Ralph H. Swingle*  
ATTORNEY

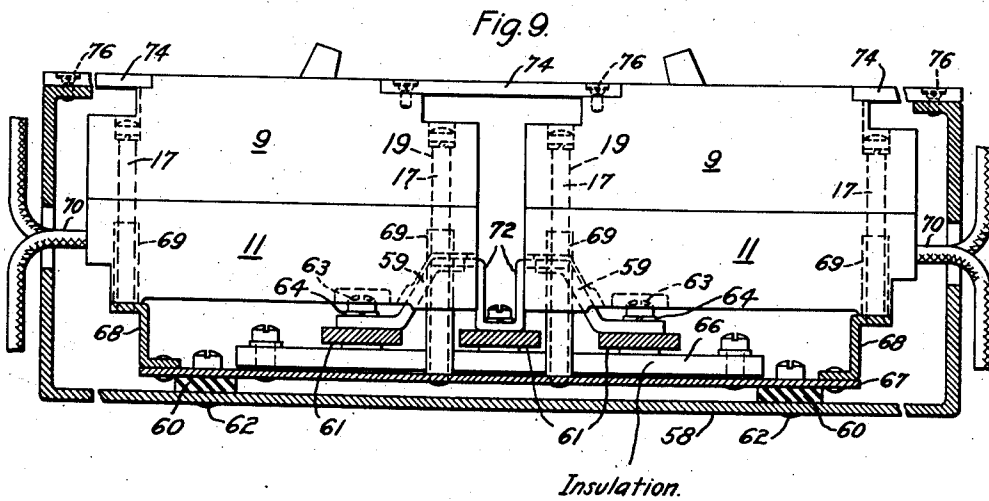
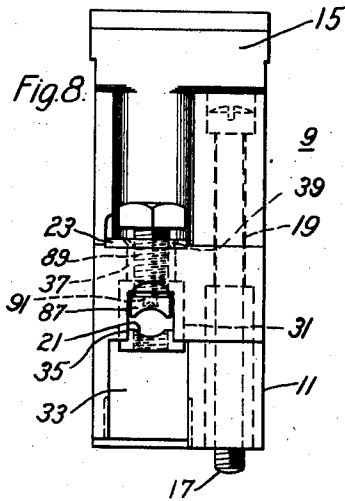
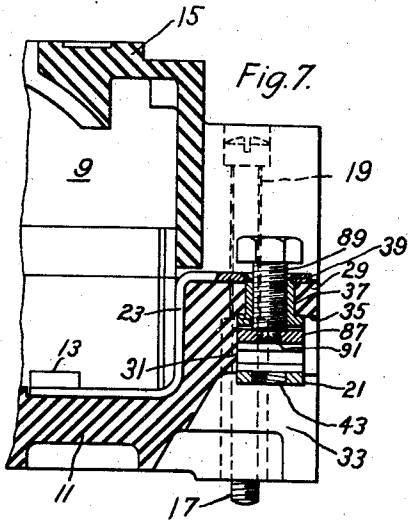
May 7, 1940.

G. J. FREESE  
CIRCUIT BREAKER

2,199,626

Filed Oct. 21, 1936

2 Sheets-Sheet 2



WITNESSES:

*Wm. B. Sellers.*  
*G. S. Parker*

INVENTOR

*Gerald J. Freese.*

BY  
*Ralph H. Swingle*  
ATTORNEY

# UNITED STATES PATENT OFFICE

2,199,626

## CIRCUIT BREAKER

Gerald J. Freese, Edgewood, Pa., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application October 21, 1936, Serial No. 106,809

17 Claims. (Cl. 175-298)

My invention relates to electrical devices in general and more particularly to terminal connectors for electrical devices.

The principal field for immediate application of the invention is in connection with electrical circuit controlling devices such as switches or circuit breakers or the like for controlling lighting and distribution feeder circuits and I shall hereinafter describe several embodiments of my invention in connection with such devices without, however, in any way intending to restrict the application or scope of my invention except as indicated by the appended claims.

There are a number of specific applications for circuit breakers and switches, each of which requires a different type of connection of the device in its circuit. The four main types of connections are briefly as follows: the front or top connection for industrial applications involving lower current ratings in which the circuit conductor is clamped by a terminal screw to the top of the terminal of the device; the end connection for industrial applications involving higher current ratings in which a separate terminal lug provided with an end opening to receive the circuit conductor is clamped to the main terminal by a terminal screw, the conductor being secured in the lug opening by soldering or other means; the switchboard connection in which the terminal of the device is provided with an opening to receive a switchboard stud from the rear of the device; and the lighting panelboard or power panel connection in which the terminal is connected by means of a screw to a power panel bus or bus strap located at the rear of the device.

In view of the several different types of connections mentioned above, it has heretofore been necessary for the purchaser of such devices to specify the particular use or type of connection required so that the manufacturer could equip the device with the proper form of terminal means to adapt the device to the use specified.

It is, accordingly, one object of my invention to provide a circuit controlling device with improved terminal connectors whereby the device may be removably connected to its circuit by any one of the four different main types of connections mentioned above.

Another object of my invention is to provide an improved terminal structure and mounting therefor for connecting an electrical device in an external circuit.

Another object of my invention is to provide an electrical device with an improved terminal structure adapting the same for a plurality of

different types of solderless removable connections to an external circuit.

Since my invention is not concerned particularly with the operating mechanisms or structural features of the circuit controlling device proper, I have limited the showing of the preferred embodiments of the invention to those parts of the device to which my invention is especially applicable.

The novel features that I consider characteristic of my invention are set forth in particular in the appended claims. The invention itself, however, both as to structure and operation together with additional objects and advantages thereof will best be understood from the following detailed description of specific embodiments thereof when read in connection with the accompanying drawings, in which:

Figure 1 is a vertical sectional view of a portion of an electrical circuit controlling device showing my improved terminal means applied thereto and illustrating an end type of electrical connection of the device to a circuit.

Fig. 2 is an end elevational view of the portion of the circuit controlling device shown in Fig. 1, illustrating certain details of my improved terminal means and the manner of mounting the same.

Fig. 3 is a vertical sectional view similar to Fig. 1 illustrating a rear type of connection of the terminal means of the device to a bus of a lighting panelboard or power panel.

Fig. 4 is a vertical sectional view similar to Fig. 1 illustrating a rear type of connection of the terminal means of the device to a switchboard stud.

Fig. 5 is a vertical sectional view of a portion of a circuit controlling device similar to Fig. 1, illustrating a slightly modified form of terminal means suitable for use with lower current values illustrating a top type of electrical connection.

Fig. 6 is an exploded view of the conducting strip and the terminal means illustrated in Fig. 1.

Fig. 7 is a vertical sectional view of a portion of a circuit controlling device similar to Fig. 1 showing a modified form of terminal structure embodied therein.

Fig. 8 is an end elevational view of the portion of the circuit controlling device shown in Fig. 7; and,

Fig. 9 is a sectional view of a lighting panelboard showing a plurality of circuit breakers embodying my improved terminal connectors mounted therein and connected to the busses and load conductors thereof.

The electrical device itself may be in the form of a switch, a circuit breaker or any other type of electrical device that may require a number of different types of electrical connections in

5 Referring to the drawings, one end portion of a circuit breaker is illustrated generally at 9. The base 11 of the circuit breaker is of molded insulating material and has mounted thereon 10 the circuit breaker operating mechanism (not shown) which has associated therewith a movable switch member (not shown) and a stationary contact 13. The particular operating mechanism and the structural features of the circuit 15 breaker proper do not form an important part of my invention and any suitable mechanism and structure may be used. A cover 15 also of molded insulating material encloses the operating mechanism and other parts of the circuit breaker and is secured to the base by means of threaded bolts 17, one at each end (only one being shown). The 20 bolts 17 pass through aligned openings 19 provided at each end of the cover and base and have threaded end portions for providing a means for securing the breaker to any suitable form of 25 support or for clamping the cover and base together.

In the application of the circuit breaker or device to circuits in which the maximum value of 30 the normal current does not exceed 25 or 35 amperes, the form of my improved terminal means illustrated in Fig. 5 provides a satisfactory terminal structure. This form of terminal means has 35 provision for removably connecting the circuit breaker to a circuit by any one of three of the main types of connections mentioned above.

Referring to Fig. 5, this form of terminal means comprises a member or insert 21 of conducting material, a terminal strip 23 and a terminal screw 45 also of conducting material. The 40 member or insert 21 has a rectangular body portion 27 and a reduced portion 29 of circular cross section. The insert 21 is adapted to be positioned in a square recess 31 provided in the base of the 45 circuit breaker which opens into a chamber 33 formed in the base 11 adjacent the lower corner thereof. The base 11 is also provided with an arched recess 35 at the end thereof, which joins the square recess 31. The reduced portion 29 of 50 the insert is received in a circular opening 37 formed in the top portion of the base 11. The conductor strip 23 has a stationary contact secured to one end thereof in any suitable manner, as for example by soldering or welding and is 55 shaped to conform with the shape of the inner surface of the base structure 11 so as to lie flat against the same. The other end of the terminal strip 23 has an opening 39 formed therein for receiving a further reduced portion 41 (see Fig. 6) 60 formed integral with the top of the reduced portion 29 of the insert 21. The corners of the end of the terminal strip 23 are bent upwardly, as indicated in Fig. 5. The insert 21 is positioned in the square recess 31 by insertion through the 65 chamber portion 33 of the base 11 and its reduced portion passes through the circular opening 37.

A vertical threaded opening 43 extends through the squared body portion 27 and the reduced portions 29 and 41. The reduced portion 41 passes 70 through the opening 39 provided in the terminal strip 23 and has its edges spun over against the same, so that the insert 21 is rigidly held in its position in the base 11. The spun over reduced portion 41, together with the shoulder formed by the reduced portion 29 engaging the cooperating

shoulder formed by the edge of the opening 37 5 on the base 11, holds the terminal strip 23 securely in engagement with the inner surface of the base 11. A terminal screw 45 is threaded into the opening 43 for the purpose of clamping 10 a conductor wire 47 to the terminal strip 23. The conductor 47 passes between the up-turned corners of the terminal strip 23 and is wrapped around the body of the terminal screw 45. A 15 washer 49 may be positioned between the conductor wire 47 and the head of the terminal screw 45, so as to provide a more efficient clamping connection. The terminal means described above may also be used to connect the circuit breaker 20 to a switchboard stud or to a power panel bus.

In connecting the breaker equipped with this form of terminal means to a switchboard stud, 25 the terminal screw 45 is removed and the switchboard stud, not shown, passes through the threaded opening 43 and is provided with a nut adjacent the free end thereof for clamping the terminal means and breaker base to the insulating 30 panel of the switchboard in a manner similar to the connection shown in Fig. 4. The terminal means is adapted to be connected to a bus strap 25 of a lighting panelboard or power panel bus by removing the terminal screw 45 and inserting a bus bar screw of reduced diameter, which passes through the opening 43 and threadedly engages 35 an opening in the bus strap in a manner similar to that shown in Fig. 3.

It will thus be seen that the above described form of my improved terminal means has provision 35 for three different types of electrical connections of the same to an external circuit.

In applications of the circuit breaker or device to circuits having normal current values of more 40 than 25 or 35 amperes, the form of terminal means illustrated in Figs. 1, 2, 3, 4 and 6 is used. This form of terminal means may also be used 45 in connection with circuits carrying lower current values, if desired. The form of terminal means illustrated in Figs. 1, 2, 3, 4 and 6 is substantially similar to the terminal means illustrated in Fig. 5 and described in connection 50 therewith, except that the squared body portion of the insert is provided with a transverse opening 51 which passes through the same and joins the internally threaded vertical opening 43. Since the structure of this form of terminal means is 55 substantially identical in most respects to the form shown in Fig. 5, the same reference characters have been used wherever applicable. The structure of the circuit breaker base for accommodating the terminal means is identical with that shown in Fig. 5 and described in connection 60 therewith.

The base of the circuit breaker is provided with a squared recess 31 which opens at its bottom into a chamber 33 at one side into the recessed opening 35 (see Figs. 2 and 3), and at the 65 top into a circular opening 37 provided in the end of the base 11. The terminal comprises a member or insert 21 of conducting material preferably copper having a squared body portion 27, 70 a reduced portion 29 and a further reduced portion 41. The insert is provided with a vertically disposed threaded opening 43 which passes through the squared body portion and the reduced portions 29 and 41 and joins a transverse 75 opening 51. The insert is positioned in its recess by insertion through the chamber 33, the upper reduced portion thereof passes through an opening 39 provided in the terminal strip 23 and has its edge spun over against the same to securely

clamp the insert in position in its recess and the terminal strip against the inner surface of the base 11 in the same manner as described in connection with first form of terminal means. A terminal screw 45 is threaded into the upper end of the threaded opening 43 and a second flat headed screw 53 is threaded into the lower end of the opening.

The last described form of terminal means provides a means for removably connecting the circuit breaker or device to its circuit by any one of the four main types of connections without necessitating the use of lugs, additional binding screws or solder as will now be described.

In industrial applications of the breaker involving higher values of current, the conductor is connected to the terminal means in the manner illustrated in Fig. 1. In this case the terminal screw 45 is loosened and the conductor 55 is inserted in the transverse opening 51. The screw 45 is then tightened against the conductor 55 and functions to securely clamp the same in the opening 51 with a lock nut effect. The screw 53 acts as a filler to fill the lower portion of the vertical opening up to the surface of the transverse opening. If desired, the surface of the end of the lower screw 53 may be roughened to provide for a biting engagement with the conductor wire.

When the breaker is to be connected to a bus of a lighting or power panelboard, the screws 45 and 53 are removed and an elongated screw 57 (see Fig. 3) is inserted in the opening 43. The elongated screw 57 is of smaller diameter than the screws 45 and 53 and is adapted to pass through the vertical threaded opening 43 and threadedly engage a threaded opening in a bus strap 59, as shown in Fig. 3. The bus strap 59 is secured to the bus 61 by means of a screw 63 which passes through a washer 64 and an opening provided in the bus strap 59 and engages a threaded opening in the bus 61. The breaker base and cover are adapted to be mounted on the bus pan 67 of the panelboard, by means of the threaded bolts 17 which pass through the breaker cover and base 11 and engage threaded openings 65 provided in the bus pan 67. Insulating spacer sleeves 69 surround the lower portions of the threaded bolts 17.

In the lighting or power panelboard type of connection the switches or circuit breakers are adapted to be mounted side by side in a plurality of rows in the panel box in the manner illustrated in Fig. 9. The panel box 58 contains a mounting pan 67 spaced from the bottom or rear wall of the box by insulating strips 60 and secured to the wall by a plurality of screws 62. A plurality of conductor busses 61 are mounted on transverse insulating strips 66 (only one being shown). The busses 61 are centrally disposed in the panel box and extend parallel to one another. The circuit breakers 9 are mounted in rows in the box by means of their mounting bolts 17 which pass through the casings of the circuit breakers and through the spacer sleeves 69 and engage in threaded openings in the bus pan 67 and in angle irons 68 mounted on the edges of the pan. The end portions of the circuit breakers of one row are disposed transversely above one of the busses 61, while the end portions of another row of the breakers are likewise transversely disposed above another one of the busses 61. The line terminal of each breaker is thus located above a bus and is adapted to be connected to the same in the manner illustrated in Figs. 3 and 9.

It will be noted that the mounting means and

terminal connectors of the circuit breakers are such as to permit ready mounting and connection of the same or removal thereof from the open side of the panel box. The load conductors 70 of the panelboard are electrically connected to the load terminal connectors of the circuit breakers 9 by insertion in the transverse openings of the inserts in the manner illustrated in Fig. 1. Straps 72 may be mounted at intervals along the center bus 61 for connecting the same to certain of the breakers or certain of the poles thereof if multipole breakers are involved. A cover plate 74 is removably mounted on the open side of the panel box 58 by means of screws 76.

Where the circuit breaker is to be used in connection with a switchboard, the electrical connections are effected in a manner illustrated in Fig. 4. The breaker base 11 rests upon the insulating panel 71 of the switchboard. A switchboard stud 73 passes through the panel 71 and has a reduced portion 75 of smaller diameter than that of the internally threaded opening 43 which passes upwardly therethrough. A nut 77 is threaded on the upper threaded end of the switchboard stud 73 and serves to electrically connect the same to the terminal strip 23, and also to securely clamp the base in engagement with the insulating panel 71 in cooperation with an insulating spacer 79 and a nut 81 mounted on the stud 73 beneath the panel. The switchboard stud passes through an opening provided in a bus bar 83 and is electrically connected to the same by means of a pair of nuts 85. The other terminal of the circuit breaker is connected to a second switchboard stud in the same manner as previously described.

The form of terminal connector shown in Figs. 1 to 4 may also be used when it is desired to connect the breaker to an individual circuit involving lower normal current values by connecting the conductor to the top of the terminal in the same manner described in connection with the terminal illustrated in Fig. 5. This form of terminal as well as the form illustrated in Fig. 5 lends itself to the use of separate terminal lugs if for any reason such connection is desired.

Figs. 7 and 8 illustrate a slightly modified form of the terminal connector shown in Figs. 1, 2, 3 and 4. This form of terminal and the manner of mounting the same are identical in all respects to the form illustrated in Figs. 1 through 4 except that the transverse opening in the insert is substantially rectangular in shape instead of circular to accommodate a copper clamping shoe 87. The shoe 87 is of a width slightly less than that of the transverse opening and of a length equal to that of the opening. The under surface of the shoe may be hollowed out as indicated in Fig. 8 to fit a conductor wire, and the surface of the hollowed out portion may be roughened to more firmly clamp the conductor wire. The bottom of the square transverse opening may also be hollowed out to provide a trough to receive the conductor wire. A special screw 89 is provided with a pin 91 which passes through an opening in the shoe 87. The end of the pin is fringed and pressed over against the edges of the opening in order to provide a removable pivotal coupling between the pin and the shoe. The conductor wire is adapted to be inserted in the square opening between the shoe 87 and the bottom wall of the opening and the screw 89 is turned down to firmly clamp the conductor wire in said opening. This form of terminal means may also be used to connect the device in its circuit by any one of the

previously described types of connections by removing the screw 89 and the shoe 87. The removal of the shoe is readily effected by fully unscrewing the screw 89 which causes the fringed ends to be pulled through the opening in the shoe.

While several forms of terminal means have been described in connection with a single pole circuit breaker, it is obvious that they are equally applicable to multipole circuit breakers and other forms of electrical devices.

It will thus be seen that a circuit controlling device equipped with my improved terminal means has provision for any one of three or more different types of electrical connections of the device to an external circuit depending on which form is used, without necessitating the use of terminal lugs, additional binding screws or solder, thus greatly facilitating installation of the device.

While in accordance with the patent statutes I have disclosed several embodiments of my invention, the principles herein involved are applicable to other structures, and I desire, therefore, that the language of the accompanying claims shall be accorded the broadest reasonable construction and that my invention be limited only by what is explicitly stated in the claims and by the prior art.

I claim as my invention:

1. In an electrical device the combination of a base for supporting said device and terminal means for removably connecting said device in a circuit, said terminal means comprising a terminal strip and a member of conducting material secured to said strip having a vertically threaded opening extending therethrough and a transverse opening extending through a side of said member and joining said vertical opening, a clamping shoe disposed in said opening, and a terminal screw threaded in said vertical opening and removably coupled to said shoe.

2. In a circuit controlling device, a base provided with recesses adjacent the ends thereof, terminal means secured in said recesses for removably connecting said device in a circuit, said terminal means each comprising a member of conducting material provided with a vertical internally threaded opening and a transverse opening joining the vertical opening, both openings extending through said member, a clamping shoe disposed in said transverse opening, a screw threaded in said vertical opening and means for removably and pivotally coupling said shoe to the end of said screw.

3. In a circuit breaker panelboard, a bus and a plurality of circuit breakers each having a base of insulating material, terminal means for connecting each breaker in a circuit of the panelboard, comprising a pair of identical metallic inserts secured in recesses provided in said base, each of said inserts having an internally threaded opening extending therethrough perpendicular to the base and a transverse opening joining the first said opening and extending through a side of the insert, an elongated screw extending through the first said opening of one of said inserts of each breaker for engaging said bus and a terminal screw threaded in the first said opening of the other of said inserts of each breaker for clamping a load conductor of the panelboard in the transverse opening of said last mentioned insert.

4. In an electrical device, a base, terminal means supported by the base for providing a plurality of types of removable electrical connections of said device to an electrical circuit, said means comprising a member of conducting mate-

rial having a vertical threaded opening extending therethrough and a horizontal opening joining said vertical opening and extending through a side of said member, said vertical opening being adapted to receive a terminal screw to clamp a conductor in said horizontal opening for one of said types of connections, and for receiving an elongated screw of reduced diameter upon removal of the terminal screw, adapted to pass through said member and engage a bus connection for a second type of connection, and for receiving a threaded conducting stud of a switchboard upon removal of the aforementioned screws for a third type of connection; and means independent of the openings, screws and stud for securing said member to the base.

5. In an electrical circuit controlling device, the combination of circuit controlling mechanism, a base of insulating material for supporting said mechanism, terminal means supported by the base for providing a plurality of different types of electrical connections of said device to an electric circuit, said means comprising a member of conducting material having a vertical threaded opening extending therethrough and a horizontal opening joining said vertical opening and extending through a side of the member, said vertical opening being adapted to receive a terminal screw for clamping a conductor inserted in said horizontal opening for one type of connection, and adapted to receive an elongated screw upon removal of the terminal screw, for passing through said opening and engaging a bus connection for a second type of connection, and for receiving a threaded conducting stud of a switchboard upon removal of the aforementioned screws for a third type of connection; and means independent of said openings and screws for securing said member to said base.

6. In an electrical device, a base of insulating material having recesses formed therein, terminal means in said recesses for providing a plurality of different types of removable electrical connections of said device to an electric circuit, said terminal means each comprising a member of conducting material having a vertical threaded opening extending therethrough and a horizontal opening joining said vertical opening and extending through a side of the member, said vertical opening being adapted to receive a terminal screw for clamping a conductor in said horizontal opening for one type of connection, and adapted to receive a headed elongated screw in place of the terminal screw, which passes through the vertical opening for engaging a bus connection for a second type of connection, and adapted to receive a threaded conducting stud of a switchboard in place of the aforementioned screws for a third type of connection, and means independent of the threaded opening, and the screws or studs for clamping said members in the recesses in said base.

7. In an electrical device, a base of insulating material having a recess therein and a vertical opening extending through the base into the recess, a terminal insert disposed in the recess having a reduced portion extending through the opening forming a shoulder for engaging the lower edges of the opening, a conducting terminal strip on the base for connecting the device to the insert, said strip having an opening for receiving the end of the reduced portion of the insert, means securing the strip to the reduced portion of the insert so as to clamp the insert to the base with its shoulder against the edges of the

opening in the base, and the conducting strip to the base, said insert having a vertical opening for accommodating means for connecting the insert to an electric circuit.

8. In an electrical device, a base of insulating material having a recess in its underside and a vertical opening extending through the base into the recess, a terminal member of conducting material disposed in the recess having a reduced portion extending through the opening to form a shoulder for engaging the lower edge of the opening, a conducting terminal strip on the base for connecting the device to the terminal member, said strip having an opening for the reduced portion of the member, means for securing the strip to the reduced portion of the member to clamp the member in the recess and the strip against the base, said member having a horizontal opening, a vertical threaded opening extending from the horizontal opening through the top of the member and an aligned vertical opening extending from the horizontal opening through the bottom of the member, said openings being adapted to receive connecting means for connecting the device to an electric circuit.

9. In an electrical circuit controlling device, a base of insulating material having a recess in its underside opening through the bottom and end of the base, and an opening through the base from the recess through the top of the base, a terminal member disposed in the recess having a reduced portion extending up through the opening forming a shoulder for engaging the lower edges of the opening, a terminal strip on the base for connecting the device to said terminal member said strip having an opening for the upper end of the reduced portion, means securing said strip to the reduced portion so as to clamp said member with its shoulder against the lower edge of the opening and the strip against the base, said terminal member having a vertical threaded opening extending therethrough and a horizontal opening joining the vertical opening and extending through the side of the member, said openings adapting the terminal member for end, bus strap, or switchboard type of electrical connection to an electric circuit.

10. In an electrical device, a base of insulating material having a shouldered opening, a terminal means disposed in said opening for connecting the device to an electric circuit, said terminal means comprising a member of conducting material having a vertical threaded opening extending there-through for receiving means for connecting the device to an external circuit, said member having a shoulder for cooperating with the shoulder formed in the opening, and means including said shoulders and independent of said threaded opening and connecting means for clamping said member in its opening in the base.

11. In an electrical device, a base, a terminal through which the device may be connected in an electrical circuit, said terminal comprising means of conducting material having a threaded vertical opening extending thereinto from the top, a threaded vertical opening extending thereinto from the bottom and connecting with said top opening and a horizontal opening extending into said top opening, and means securing said terminal to the base without preventing the insertion of a conductor into any of said openings.

12. In an electrical device, a base having an opening extending therethrough, a terminal disposed in said opening for detachably connecting said device to an electrical circuit, said terminal

having a shoulder engaging the edge of said opening on one side of said base and a reduced portion extending through said opening, a conducting terminal strip on the opposite side of said base having an opening for receiving the reduced portion of said terminal, the end of said reduced portion being spun over against said terminal strip to connect said strip to the terminal and to hold said terminal in said opening and said strip against the base, said terminal having an opening for receiving a means for connecting the terminal to an electric circuit.

13. A solderless terminal comprising a single member of conducting material having a transverse opening for receiving a conductor and a vertical threaded opening joining said transverse opening and extending clear through said member, a clamping shoe disposed in said transverse opening for clamping a conductor therein and a screw in said vertical opening removably coupled at its inner end to said shoe, said member having means for securing the same to a base.

14. A solderless terminal comprising a single member of conducting material having a transverse opening for receiving a conductor, and a vertical threaded opening joining said transverse opening and extending clear through said member, a clamping shoe in said transverse opening for clamping the conductor therein and a screw in said vertical opening having its lower end rotatably coupled to said shoe, the bottom wall of said transverse opening and said shoe being curved to conform to said conductor, said member having means for securing the same to a base.

15. In a panelboard, a bus and one or more electrical devices each having a base of insulating material and terminal means secured in recesses provided therefor in the base for detachably connecting said device in a circuit of the panelboard, said terminal means each having a threaded opening extending therethrough perpendicular to the base and a transverse opening joining the first said opening and extending through a side of the terminal, an elongated screw in the first said opening of one of the terminals of each device engaging said bus, and a terminal screw in the first said opening of the other terminal of each device for clamping a load conductor of the panelboard in the transverse opening of said last-mentioned terminal.

16. In a panelboard, a bus and one or more electrical devices each having a base of insulating material and terminal means secured in openings provided therefor in the base, which extend through the base, for detachably connecting said device in a circuit of the panelboard, said terminal means each having a threaded opening extending therethrough perpendicular to the base and a transverse opening joining the first said opening and extending through a side of the terminal, an elongated screw in the first said opening of one of the terminals of each device engaging said bus, and a terminal screw in the first said opening of the other terminal of each device for clamping a load conductor of the panelboard in the transverse opening of said last-mentioned terminal, and means independent of the openings in said terminals and said screws for securing said terminals in the openings in said base.

17. In an electrical device, a base having an opening therein, a terminal disposed in said opening for detachably connecting said device to an electrical circuit, said terminal having a portion extending through said opening, and carrying means of greater width than said opening

for engaging said base at one end of said opening, a conducting terminal strip on said base at the other end of said opening, said strip having an opening for receiving the portion of said terminal which extends through the opening, the end of said last-mentioned portion of said terminal being pressed over against said terminal strip to connect said strip to said terminal and to hold said terminal in said opening and said strip against the base, said terminal having a vertical threaded opening extending through the outer end thereof for receiving a connecting screw.

GERALD J. FREESE.