

Oct. 4, 1949.

B. EASTON

2,483,815

ELECTRICAL PLUG AND JACK CONNECTION

Filed March 14, 1946

2 Sheets-Sheet 1

FIG. 1.

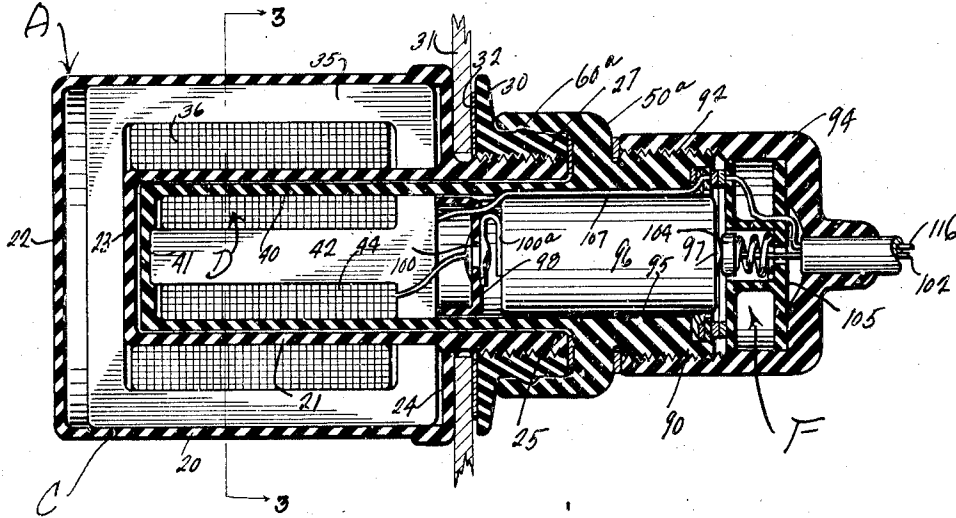


FIG. 2.

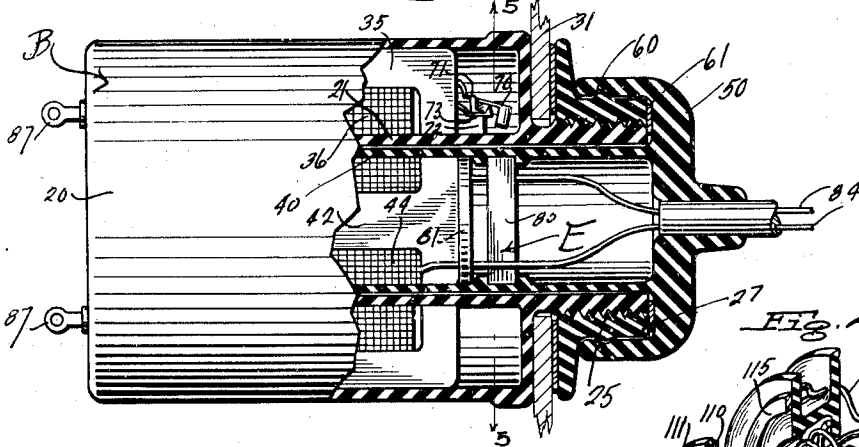


FIG. 3.

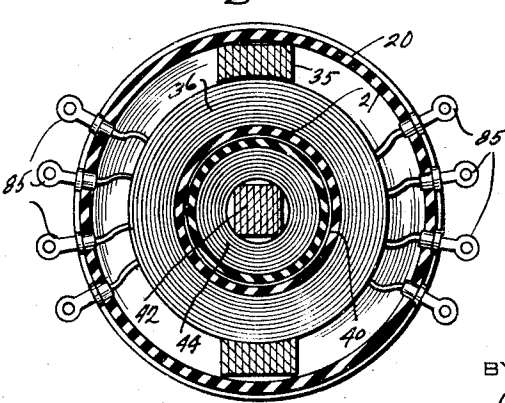
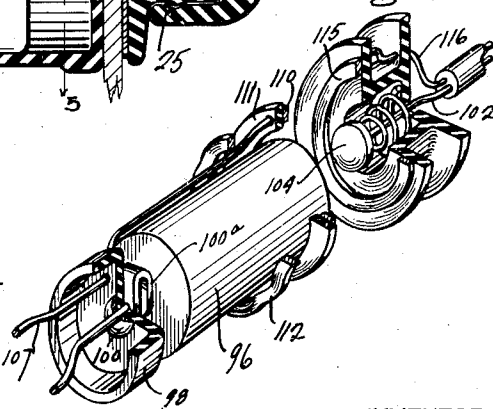


FIG. 4.



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2 Sheets-Sheet 2

Fig. 5.

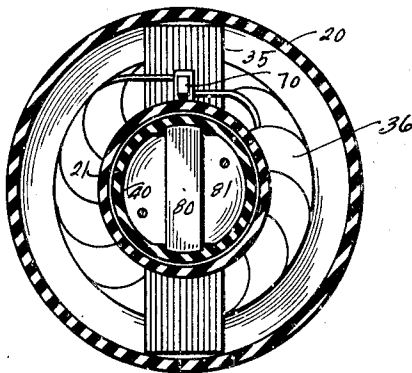


Fig. 6.

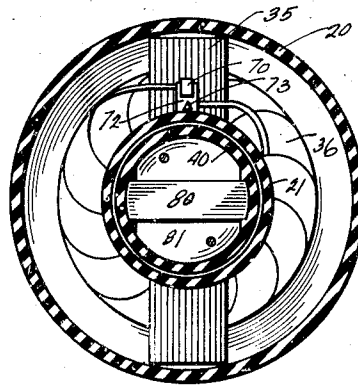


Fig. 7.

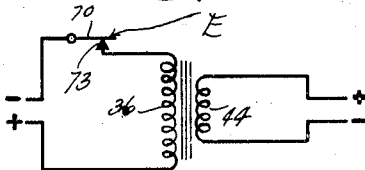


Fig. 8.

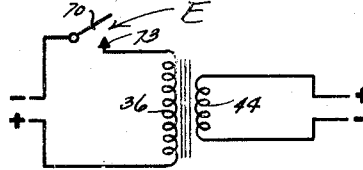


Fig. 9.

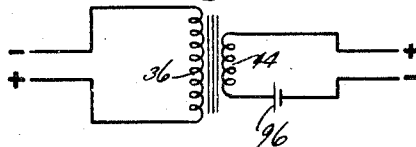


Fig. 10.

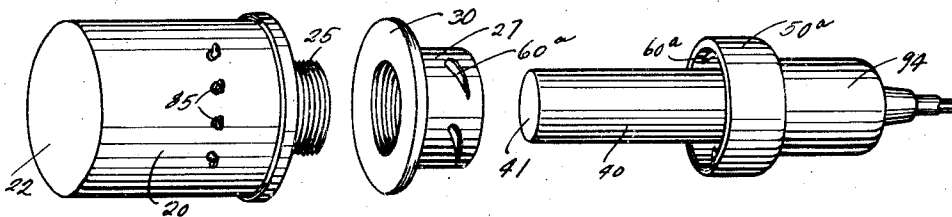
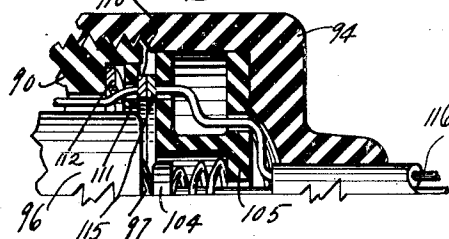


Fig. 11.



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ELECTRICAL PLUG AND JACK CONNECTION

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3 Claims. (Cl. 175—356)

1

This invention relates to improvements in electrical plug and jack connections.

The primary object of this invention is the provision of an electrical connection of the plug and jack type adapted to be used in connection with microphones, headphones, permanent magnetic speakers, and as a stepdown transformer in conventional lighting circuits; the same consisting of a simple plug and jack unit which is sealed against moisture admission under varying conditions of pressure and temperature.

A further object of this invention is the provision of a connector unit of the above mentioned nature which consists of a transformer free of external corrodable parts connecting the various portions thereof.

A further object of this invention is the provision of a plug and jack type of transformer unit, the parts of which may be readily reached for cleaning purposes.

A further object of this invention is the provision of a flash-proof type of electrical connector of the transformer type.

A further object of this invention is the provision of an improved transformer construction having associated therewith a readily removable battery arrangement for rendering the assembly adaptable for microphone use.

A further object of this invention is the provision of an insulation moisture proof plastic enclosed plug and jack transformer connector.

Other objects and advantages of the invention will be apparent from the following detailed description.

In the accompanying drawings, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a longitudinal sectional view showing the unit arranged for microphone use.

Figure 2 is a sectional view taken through the improved unit showing the same arranged for use in connection with headphones, loud speakers and a stepdown transformer in conventional lighting circuits.

Figure 3 is a transverse cross sectional view taken substantially on the line 3—3 of Figure 1.

Figure 4 is a fragmentary perspective view, partly in section, showing exploded positions of various parts of the connector as shown in Figure 1.

Figure 5 is a transverse cross sectional view taken substantially on the line 5—5 of Figure 2.

Figure 6 is a cross sectional view similar to that shown in Figure 5, but with the plug at an angle

2

of 90° in the jack, for the purpose of inoperatively positioning the windings of the parts for circuit passage.

Figure 7 is a wiring diagram showing the use of the connector for headphone, loud speaker and stepdown transformer connection, with the circuit closed for current passageway and the parts arranged as shown in Figures 2 and 5.

Figure 8 is a wiring diagram similar to that shown in Figure 7 but with the circuit open as will be the case with the parts positioned as shown in Figure 6.

Figure 9 is a wiring diagram showing the circuit arrangement of parts with the connector details assembled as shown in Figure 1 for microphone use.

Figure 10 is an exploded view showing three of the relatively detachable parts of the connector.

Figure 11 is an enlarged fragmentary sectional view showing certain contact portions of the device arranged as shown in Figure 1.

In the drawings, wherein for the purpose of illustration are shown different adaptations of the invention, the latter A may generally designate the assemblage shown in Figure 1, and B the assemblage shown in Figure 2. In each of these assemblages is provided an improved jack or socket construction C and a detachable plug construction D. They are substantially identical, except for the provision of a magnetically operated switch used in the form of invention shown in Figure 2, and wherever possible similar reference characters have been given to these parts C and D. This magnetic switch arrangement used in connection with the form of invention B is generally designated at E in Figure 2 and elsewhere, and in the form of invention A a battery assemblage F is used when the improved transformer-connector is utilized as part of a microphone setup.

Referring to the jack C, the same includes a plastic case structure consisting of outer and inner cylindrical-shaped walls 20 and 21 respectively having inner end walls 22 and 23 integrally connected therewith. The walls 22 and 23 are spaced. An outer end wall 24 connects the end of the cylindrical walls 20 and 21 intermediate the ends of the latter; the said cylindrical-shaped wall structure 21 outwardly beyond the end wall 24 being externally screw threaded at 25 for receiving a ring-shaped clamping nut 27, preferably also of plastic material. This nut 27 is provided with an annular flange at its inner end, designated at 30, and is utilized for clamping the jack housing to a panel structure 31,

3

in the relation shown in Figure 1. If desired, some sealing composition 32 may be employed to seal the connection of the ring-shaped nut 27 with the panel. In other words, moisture cannot pass the panel through the connection of the jack therewith. If desired, the wall 24 may be detachably connected in a moisture sealed relation with the cylindrical body portions 20 and 21, so access may be had to the core and windings in the jack unit. This is not shown and is a matter of mechanical expediency.

Within the compartment between the cylindrical walls 20 and 21 and the end walls 22 and 23 there is positioned a laminated substantially C-shaped core 35 receiving therein a winding 36, ordinarily the primary winding, located between the inner edges of the laminations and around the cylindrical wall 21, as shown in the drawings. This winding 36 is cylindrical-shaped, as shown, and well understood.

Referring now to the construction of the transformer assemblage as shown in Figure 2, which is adaptable for headphone, loud speaker and general housing wiring lighting circuits used, the plug unit D preferably consists of a cylindrical-shaped plastic case body 40 having an end wall 41 defining a compartment wherein is received a T-shaped core 42 having a cylindrically arranged secondary winding 44 thereon.

The core portions and windings of the plug and jack are, of course, complementary so far as transformer construction is concerned, and the T-shaped formation of the plug core is laminated also.

In connection with use of the assemblage with headphones, loud speakers and as a stepdown transformer in conventional lighting circuits, the casing structure 40 is extended through the external sleeve portion 25 of the jack casing and has a preferably integral cap 50 thereon; the cap having a socket adapted to receive the ring-shaped nut 27; the external portion of the nut 27 and the inner periphery of the cap being provided with a thread connection 60 which will admit of full connection of these parts with a quarter turn or less. The arrangement may consist of interrupted screw threads if so desired, but it is intended that a firm connection of the cap upon the nut shall be effected with but a quarter degree turn.

A washer 61 may seal the connection of the cap with the portions 25 and 27. While the cap is shown as integral with the cylinder extension of the plug casing, a sealed detachable connection could be provided if desired.

It is my intention to provide a single pole throw switch arrangement for energizing or de-energizing the coil. This consists of the assemblage E shown in Figure 2 and includes a switch arm 70 pivoted at 71 upon an insulation block 72 within the compartment of the jack forwardly of the winding. A stationary contact 73 is also mounted upon the block 72. Normally the switch arm 70 is spring or otherwise actuated to open the circuit through the winding 36, since these contacts have connection therewith.

Within the extension of the plug casing 40 there is positioned a permanent bar magnet 80 in the same plane as the armature of the switch E and when the cap 50 is in clamped position upon the nut 27 the bar magnet 80 is in line with the armature 70 and will, of course, draw the same into circuit closing position. When the cap 50 is given a quarter turn the switch arm will return to open the circuit. I prefer to provide a non-

4

magnetic brass insert 81 between the bar magnet and the laminated core 42.

The cap 50 carries the lead wires 84 which have connection with the secondary winding 44.

With reference to Figure 3 it will be noted that various terminals 85 are provided for connection to suitable leads for the purpose of giving proper impedance to the plate current of audio amplifier output tube or grid circuit of an input stage.

Referring to the assemblage A as shown in Figure 1 where a battery assemblage F is used with the transformer plug and jack, as for microphone use, the cap 50^a, which corresponds to the cap 50 of the form of invention B, is integral with the extended casing portion 40 and has a connection 60^a admitting of the plug being connected to the nut 27 by a quarter turn movement. The casing portion 40 of the jack unit is, however, extended at 90, as shown in Figure 1 and externally screw threaded at 92 for receiving a detachable plastic cap 94. The compartment 95 provided in the outer end of the casing structure 40 receives a dry cell battery 96 having a central outer end contact 97.

A plastic insulation cup-shaped insert 98 is located in the casing 40 immediately at the outer end of the coil 42 and it has a contact 100 connected to one of the wires leading to the winding 44. This contact 100 has a spring arm 100^a which engages the casing of the battery 96 and grounds the battery in the circuit of the secondary winding. The central outer end contact 97 of the battery is connected in circuit with the lead wire 102 attached to the outer end of the cap 94 by means of a spring urged terminal contact 104 which is retained within an insulation disc-type insert 105 in the outer end of the cap 94, as shown in Figure 1.

The other wire 107 leads from the secondary winding along the casing 40 in a secured relation and is attached to a contact ring 110 mounted upon an insulation washer 111 located in a countersunk seat within the outer end of the extension 90 of the plug casing. This washer is movable in the seat and normally urged outward by a resilient wavy type of compression ring 112, best shown in Figure 4. The insulation ring or disc 105 has a contact ring 115 on the inner end thereof adapted to seat against the ring 110 to establish contact with the other lead wire 116 carried by the cap.

It will be apparent from the foregoing that a relatively simple type of seal plug and jack transformer assemblage has been provided which is water-proof, shock-proof and flash-proof and can be used for a large variety of purposes. For instance, its flash-proof ability will enable it to be used in mining installations or where explosive gases or chemicals are stored or utilized.

It is to be understood that all parts of the casing, as well as insert structures in the drawings will be fabricated of plastic or other approved insulation which has a low moisture absorption rate over a long period of time.

I wish it to be understood that the magnet switch arrangement shown in Figure 2 is not essential to operation of the device.

Various changes in the shape, size and arrangement of parts may be made to the form of invention herein shown and described, without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. In a transformer type connector the combination of complementary telescoping jack and

5

plug sections, means to detachably connect them upon a support against relative axial movement, and complementary interfitting laminated core and windings in each of said jack and plug sections completely insulated respectively therein against moisture access thereto.

2. In a transformer type connector unit the combination of a pair of complementary telescoping casings of insulation material each defining a hermetically sealed compartment, complementary laminated core and windings hermetically sealed in each of said compartments, and means to detachably connect said casings with the cores and windings in operative relation to each other.

3. In a moisture, flash and shock-proof electrical connector unit, the combination of a jack casing of insulation material having a hermetically-sealed compartment, and providing an inner end wall, an outer end wall, a side wall joining said end walls and a socket-providing wall structure, including a third end wall, adjacent to and spaced from said inner end wall and substantially paralleling said inner end wall, and an inner side wall joining said third end wall and extending to said outer end wall, said third end wall and said inner side wall defining a socket opening at said outer end wall; a core and winding in said com-

6

partment and surrounding portion of said socket-providing wall structure; a plug casing of insulation material interfitting in said socket and having a sealed compartment; a core and winding structure in said sealed compartment of said plug casing, constructed and arranged for complementary association with said core and winding in the jack casing; and means upon said casings for detachably connecting said casings together against axial displacement.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,505,325	Elbert	Aug. 19, 1924
1,657,002	Cragg	Jan. 24, 1928
1,657,840	Nelson	Jan. 31, 1928
1,935,169	Williams	Nov. 14, 1933
1,964,265	Markley	June 26, 1934
2,176,064	Cole et al.	Oct. 17, 1939
2,283,942	Morris	May 26, 1942
2,413,201	Tillman	Dec. 24, 1946