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RECEPTACLE AND PLUG ASSEMBLIES

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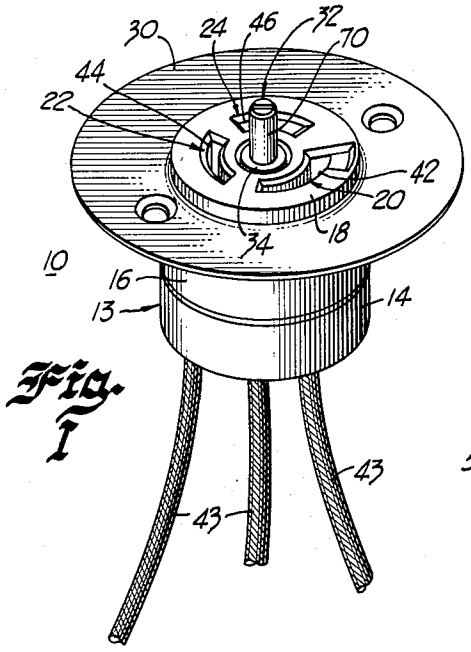


Fig. 1

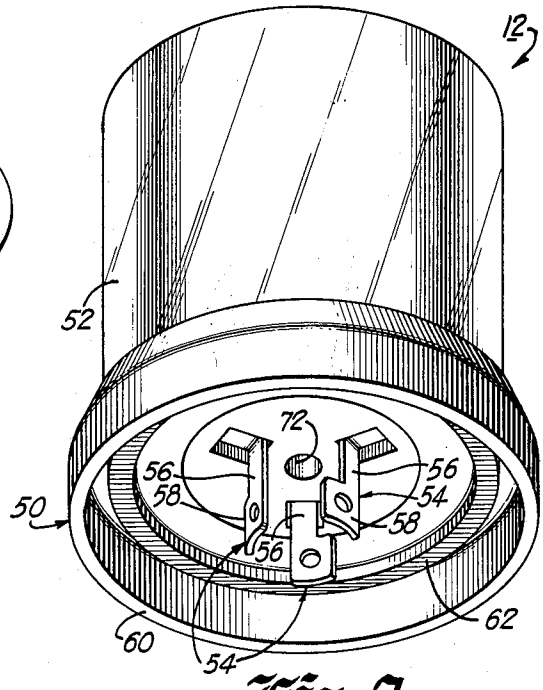


Fig. 2

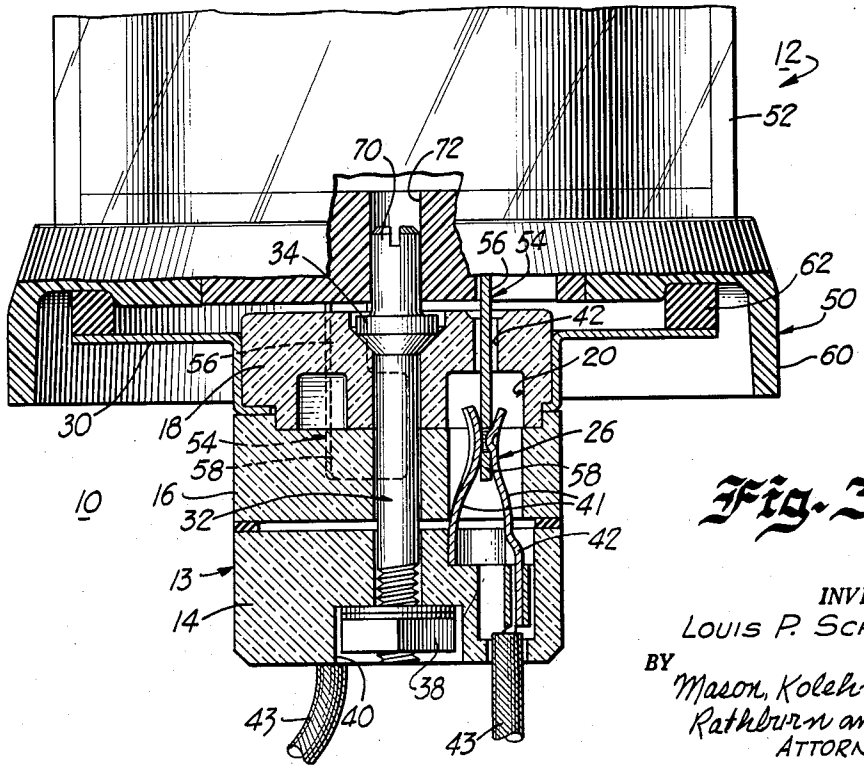


Fig. 3

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RECEPTACLE AND PLUG ASSEMBLIES

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This invention relates to electrical receptacles and plug assemblies, and more particularly to an improved electrical receptacle of the type which will selectively receive complementary plugs while preventing assembly of other plugs therewith. More particularly, the present invention relates to an improved electrical receptacle of the type adapted to receive a photoelectric control in such as is used with a lighting luminaire.

The present invention is an improvement over the receptacle described and claimed in the copending application Serial No. 81,432, filed January 9, 1961, now Patent No. 3,083,347 by James H. Fahey, Jr., and assigned to the same assignee as the present application.

The present large volume installation of photoelectrically controlled lighting luminaires makes it desirable that the photoelectric control unit therefor may be quickly assembled and disassembled from the luminaire housing in a safe and economical manner for repair or replacement. It has become common in this country to provide street lighting and other luminaires in various voltage ranges, namely, in an approximately 120-volt range and an approximately 240-volt range. Heretofore, the electrical receptacles for both voltages of photoelectric control units have been identical. Moreover, the photoelectric control unit in both the 120 voltage range and the 240 voltage range has been physically identical, at least in outside dimension, and has differed only in the voltage ratings of its components. Accordingly, difficulty has been experienced in that the accidental insertion of a 120-volt photoelectric control into a receptacle connected to a 240 voltage source would result in the burning up of the photoelectric control. It will be appreciated that such photoelectric controls are relatively complex and of significant cost. Of course, the accidental insertion of a 240-volt photoelectric control into a receptacle wired for 120-volt service will not damage the control but will merely result in failure of the control to operate the circuit.

It is therefore an object of the present invention to provide an improved electrical receptacle and plug assembly which overcomes the above-mentioned difficulty.

A further object of the present invention is to provide an improved electrical receptacle.

It is a yet further object of the present invention to provide a receptacle for selectively receiving photoelectric control units of a predetermined voltage only.

Further objects and advantages of this invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

Briefly stated, in accordance with the present invention, the improved electrical receptacle is of the type similar to that described and claimed in the above-mentioned copending Fahey application and is provided with a housing containing a plurality of contact assemblies each including a pair of resilient contact portions and a terminal portion for connection to an external lead wire. The housing is provided with a plurality of entrance slots which are adapted to receive contacts for electrical engagement with the contact portions of the electrical receptacle. A complementary plug is provided with a base having a plurality of electrical contacts extending from the base and adapted to extend through

the slots of the receptacle to engage the contact portions of the receptacle. In accordance with the present invention, the receptacles for connection to a 240-volt electrical source are provided with a projection extending toward the base of the complementary plug and the base of the plug intended for the 240-volt service is provided with a recess adapted to receive the projection in the receptacle so that only plugs with such recesses can be assembled with the receptacles provided with the projections. In this manner, only 240-volt photoelectric control units may be assembled in the receptacles which are wired in a 240-volt source.

The nature of the invention will best be understood when described in connection with the accompanying drawing, in which:

FIG. 1 is a top isometric view of an electrical receptacle according to the present invention;

FIG. 2 is a bottom isometric view of a photoelectric control unit according to the present invention, and

FIG. 3 is a fragmentary elevational view, partly in cross section, of a photoelectric control unit assembled in a receptacle in accordance with the present invention.

Referring now to the drawing, there is illustrated an improved electrical receptacle best illustrated in FIG. 1 and generally indicated by the reference numeral **10**, and a complementary plug best illustrated in FIG. 2, here shown as a photoelectric control unit and generally indicated at **12**. The electrical receptacle **10** is similar to that more fully illustrated and claimed in the above-mentioned copending Fahey application and, briefly, comprises a housing **13** formed of a bottom disc or cylinder **14**, a center disc or cylinder **16**, and a top disc or cylinder **18**. The housing **13** is provided with three sets of openings **20**, **22**, and **24** therethrough, each forming a contact housing chamber enclosing respective contact assemblies **26**, FIG. 3. A mounting flange **30** is assembled between the top cylinder **18** and the center cylinder **16**. The cylinders **14**, **16**, and **18** are secured together to form the housing **13** by a bolt **32** having a head **34** countersunk in the upper surface of the top cylinder **18** and extending through a central aperture formed in each of the cylinders **14**, **16**, and **18**, and provided with a nut **38** in a recess **40** in the lower surface of the bottom cylinder **14**. As more fully described in the above-mentioned copending Fahey application, the cylinders **14**, **16**, and **18** are held against relative rotation in any suitable manner, as well as being held against rotation relative to the flange **30**. Moreover, the housing **13** is preferably hermetically sealed in any suitable manner.

In order to provide for electrical connection to a complementary plug, each of the contact assemblies **26** is provided with a pair of elongated resilient contacts or contact portions **41** and a terminal portion **42** adapted to be connected with a lead wire **43**. Each of the contact assemblies **26** is recessed into a contact housing chamber formed by a respective one of the openings **20**, **22**, and **24**; and the top cylinder **18** additionally includes a plurality of arcuately shaped entrance slots communicating with each of the housing chambers and identified as **42**, **44**, and **46**, respectively. As more clearly illustrated in FIG. 1, the openings **22** and **24** are identical; however, one of these openings **20**, is adapted to receive a larger plug terminal than the other two, thereby to provide for a polarized receptacle **10**. To this end, it will be observed that the slot **42** is arcuately longer than the slots **44** and **46**.

The receptacle **10** is particularly adapted to receive a complementary plug of the type illustrated in FIG. 2, and constitutes the photoelectric control unit **12**. As therein illustrated, the plug **12** includes a base portion **50** carrying an inverted cup-shaped transparent housing **52**. The base member **50** has a plurality of depending

male contact members 54 extending therefrom and is further provided with a downwardly depending outer flange 60 and a resilient sealing gasket 62 adapted to seat against the outer periphery of the mounting flange 30 to hermetically seal the contact members 54 and openings 22 and 24. Each of the contact members 54 is L-shaped and of arcuate cross section and includes a first vertical leg portion 56 and a second or horizontal leg or lug portion 58 formed along the lower side edge of the vertical leg portion 56. The contact members 54 are of sufficient length and thickness to extend through the slots 42, 44, and 46 in the top cylinder 18 to be resiliently received between the pairs of contacts 41 and the arcuate portions 42, 44, and 46 of the openings 22, 24, and 26 are sufficiently long so that, after insertion of the contact members 54, the photoelectric control unit 12 may be twisted or rotated relative to the receptacle 10, and the lug portions 58 of the contact members 54 will lock against the edge of the top cylinder 18 thereby securing the plug members 12 within the receptacle 10. The housing 52 encloses suitable photoelectric control components (not shown) in electrical circuitry with the contact members 54.

In accordance with the present invention, the electrical receptacle 10 is provided with a centrally positioned vertically extending projection in the form of a stud 70 integral as part of the bolt 32 and extending upwardly from the head 34 thereof. Moreover, the suitable electric control unit 12 intended for assembly with those receptacles 10 provided with studs 70 will be provided with a central recess or opening 72 aligned to receive the stud 70 when assembled with the receptacle 10.

From the above description the operation of the improved electrical receptacle and photoelectric control unit assembly is believed clear. However, briefly, it will be understood that the electrical receptacles connected to a 240-volt source of electrical energy will be provided with the upwardly extending projections 70 and, similarly, the photoelectric control unit 12 intended for 240-volt service will be provided with complementary recesses 72. Moreover, it will be understood that electrical receptacles connected to a 110-volt source of electrical energy will not contain any projection corresponding to the stud 70 and, further, photoelectric control units intended for use on 110-volt service will not contain complementary recesses on their base. Accordingly, only 240-volt photoelectric control units can be assembled with the electrical receptacles 10 wired to a 240-volt source of electrical energy; the projections 70 will prevent the assembly therewith of a 120-volt photoelectric control unit which, as above-described, is not provided with a recess to accommodate the projection 70. Moreover, although a 240-volt service photoelectric control unit may be assembled in a 120-volt receptacle, no damage will occur to the photoelectric control unit but the photoelectric control unit will merely fail to operate.

While a preferred embodiment of the invention has been described by way of illustration, many modifications will occur to those skilled in the art. It was therefore intended in the appended claim to cover all such modifications as fall within the true spirit and scope of this invention.

What is claimed as new and is desired to be secured by Letters Patent of the United States is:

An electrical receptacle comprising three insulating cylinders assembled one upon the other and interlocked against relative rotation to form a cylinder assembly and provided with three sets of openings through said assembly, each set having an enlarged central opening defining a contact housing chamber, each set additionally including a lead wire receiving opening extending from its contact housing chamber through one end of said assembly and an arcuately shaped contact entrance slot extending from said contact receiving chamber through the other end of said assembly; a plurality of contact members, each including a pair of resilient contacts and a terminal portion adapted to receive a lead wire; a mounting flange secured between a pair of said cylinders; said cylinders being held together by an axially extending bolt member concentric with said cylinders and having a head countersunk into said other end of said assembly and threadedly receiving a nut through said one end of said assembly, said bolt having a stud projecting axially therefrom integral therewith from said head.

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