

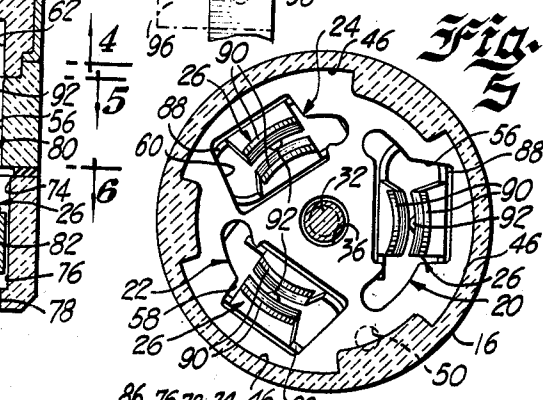
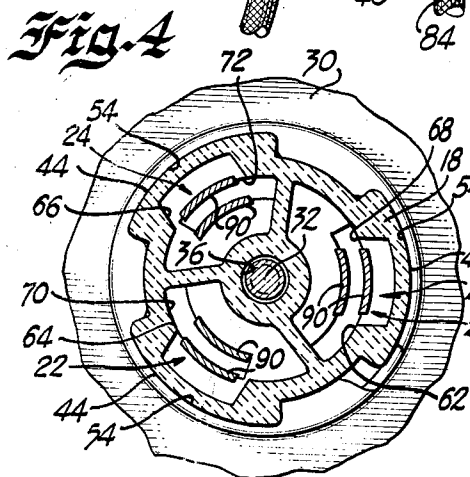
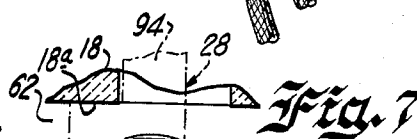
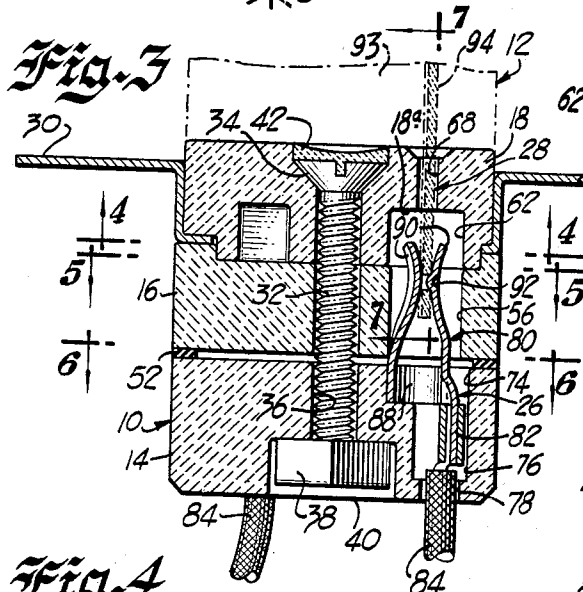
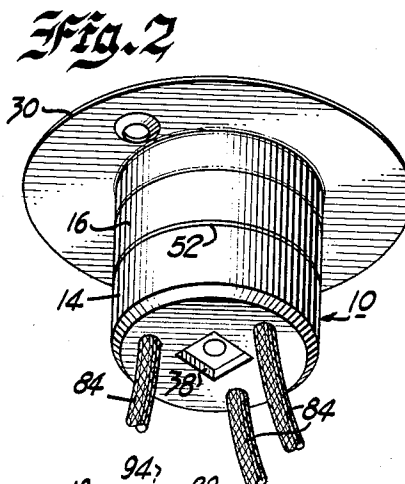
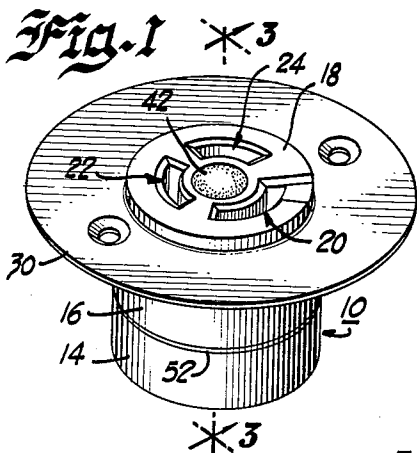
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RECEPTACLE

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This invention relates to electrical receptacles and more particularly to an improved electrical receptacle and to an electrical connector including an improved electrical receptacle of the type adapted to receive a photoelectric control in a lighting luminaire.

The present large volume installation of photoelectrically controlled lighting luminaires makes it desirable that the photoelectric control unit may be quickly assembled and disassembled from the luminaire housing in a safe and economical manner for repair or replacement. As is well known, luminaires are conventionally installed outside where they are subjected to adverse weather conditions as to rain, humidity, and temperature. It is therefore desirable that the receptacle which receives the photoelectric control be able to withstand such adverse conditions.

It is therefore an object of the present invention to provide an improved electrical receptacle.

A further object of the present invention is to provide an improved electrical receptacle which is particularly adapted to withstand adverse weather and temperature conditions.

A further object of the present invention is to provide an improved electrical receptacle adapted to receive and interlock a complementary plug.

A further object of the present invention is to provide an improved electrical receptacle which may be readily and economically manufactured, assembled, and installed.

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 invention, the improved electrical receptacle includes three insulating disks or cylinders which are assembled one upon the other and interlocked against relative rotation therebetween. The bottom cylinder contains openings for lead wires and also positions electrical clamps forming contacts for receiving a plug member. The contacts extend through recesses in the center cylinder and protrude into a similar recess formed in the top cylinder. A mounting flange is assembled between the top and center cylinders.

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

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

FIG. 2 is a bottom isometric view of the electrical receptacle according to FIG. 1;

FIG. 3 is a cross sectional view of the electrical receptacle of FIG. 1, taken along line 3—3 thereof, and drawn to a larger scale, and additionally fragmentarily illustrating a plug member interlocked therewith;

FIG. 4 is a cross sectional view of the electrical receptacle of FIG. 3, taken along line 4—4, assuming that FIG. 3 shows the whole receptacle, and omitting the plug member for purposes of clarity;

FIG. 5 is a cross sectional view of the electrical receptacle of FIG. 3, taken along line 5—5 thereof, assuming that FIG. 3 shows the whole receptacle, and omitting the plug member for purposes of clarity;

FIG. 6 is a sectional view of the improved electrical

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receptacle of FIG. 3, taken along line 6—6 thereof, and assuming that FIG. 3 shows the whole receptacle; and

FIG. 7 is a side view of one of the contact members of the plug member which is adapted to interlock with the electrical receptacle.

Referring now to the drawings, and particularly to FIG. 3 thereof, there is illustrated an improved electrical receptacle according to the present invention and generally indicated by the reference numeral 10 and a complementary plug member fragmentarily illustrated at 12 and which may consist, for example, of a photoelectric control for a lighting luminaire. The electrical receptacle 10 includes a bottom disk or cylinder 14, a center disk or cylinder 16, and a top disk or cylinder 18. The cylinders 14, 16, and 18 form a cylinder assembly provided with three sets of opening 20, 22, and 24 therethrough. Each of the sets of openings 20, 22, and 24 houses a terminal assembly 26. The plug 12 is provided with a plurality of complementary arcuate-shaped contact members 28 which electrically engage the terminal assemblies 26. A mounting flange 30 is assembled between the top cylinder 18 and the center cylinder 16.

In order to interlock the cylinders 14, 16, and 18 against relative rotation and to secure the cylinders into a cylinder assembly, there is provided a bolt 32 having a countersunk head 34 in the upper surface of the top cylinder 18 and extending through a central aperture 36 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. An insulating compound 42 may cover the head 34 of the bolt 32. The top cylinder 18 and the center cylinder 16 are interlocked by the provision of splines 44 in the top cylinder 18 which protrude into grooves 46 in the center cylinder 16. The bottom cylinder is held against relative rotation by a dimple or detent 48 in the upper surface thereof which fits in a complementary indentation 50 in the center cylinder 16. A sealing gasket 52 is positioned between the bottom and the center cylinders 14 and 16 to form a weathertight seal in the receptacle. The flange 30 is also interlocked in the cylinder assembly against relative rotation by the splines 44 of the top cylinder 18 which protrude through complementary recesses 54 (FIG. 4) in the flange 30. If desired, as best illustrated in FIGS. 4 and 5, certain of the recesses 54 and 46 and corresponding ones of the splines 44 may be made a different size, or may be eccentrically located, so that the flange 30 and the center and top cylinders 16 and 18 may be assembled in only one relative position.

In order to house the terminal assemblies 26 and the contacts 28, each of the openings 20, 22, and 24 includes an enlarged central portion or recesses 56, 58, and 60 respectively formed in the center cylinder 16, and communicating enlarged portions or recesses 62, 64, and 66 are recessed into the lower surface of the top cylinder 18 so that each pair of enlarged portions 56 and 62, 58 and 64, and 60 and 66 define a contact housing chamber. The top cylinder 18 additionally includes an arcuate-shaped entrance slot communicating with each of the recesses 62, 64, and 66 and identified as 68, 70, and 72. As most clearly illustrated in FIGS. 4 and 5, the openings 22 and 24 are identical; however, one of the 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 68 is arcuately longer than the slots 70 and 72; moreover, the enlarged portions 56 and 62 are larger than the other enlarged portions 58, 64, and 60, 68. The bottom cylinder 14 is provided with a plurality of terminal receiving recesses 74 forming a part of the openings 20 and adapted to receive the base portion of a terminal assembly 26. Adjacent one edge of each of the recesses 74 extending

downwardly from the upper surface of the bottom cylinder 14 is a pair of concentric apertures 76 and 78 forming a counterbored hole for receiving electrical lead wires to the receptacle 10.

Referring now to the terminal assemblies 26 used in the receptacle 10, all the terminal assemblies 26 are identical and for purposes of simplicity one is herein described. Each terminal assembly 26 includes a one piece terminal clamp member 80, FIG. 3, having a downwardly extending terminal tab portion 82, and additionally including an insulated lead wire 84 clamped against the terminal portion 82 by an indented compression ring 86. The terminal clamp member 80 includes a resilient U-shaped base clamp portion 88 including a pair of legs 88a and a bight portion 88b (FIG. 6) fitted in the recesses 74 in the bottom cylinder 14 and having formed integral therewith extending from adjacent edges of the legs 88a a pair of resiliently spaced contact portions 90 of arcuate cross section and extending through the enlarged portions 56, 58, and 60 in the center cylinder 16 and protruding into the enlarged recesses 62, 64, and 66 in the top cylinder 18. At least one portion of each pair of contact portions 90 is provided with a detent 92 extending inwardly toward the other of the contact portions. The terminal assemblies 26 are preassembled and are positioned with the base portion 88 of the terminal member 80 positioned in the recesses 74 in the bottom cylinder 14, and the center cylinder 16 is then assembled with the bottom cylinder 14 with at least a part of the base portions 88 covered by the center cylinder 16 to lock the terminal assemblies 26 between the cylinders 14 and 16 as best shown in FIG. 5. In this manner the terminal assemblies 26 are positioned in the openings 20, 22, and 24 without the use of rivets or other fastening devices. The terminal portion 82 which extends downwardly from the edge of one of legs 88a of the base portion 88 and the compression ring 86 fit in the larger of the concentric openings 76 while the lead wires 84 extend through the smaller of the concentric openings 78 to be clamped to the terminal portions 82 by the rings 86.

The receptacle 10 is particularly adapted to receive a complementary plug of the type fragmentarily illustrated in FIGS. 3 and 7 and which include a body portion 93 having the plurality of depending male contact members 28 extending therefrom. Each of the contact members 28 is L-shaped and of arcuate cross section, and including a first or vertical leg portion 94 and a second or horizontal leg or lug portion 96 formed along the lower side edge of the vertical leg portion 94. The contacts 28 are of sufficient length and thickness to extend through the slots 68, 70, and 72 in the top cylinder 18 and to be resiliently received between the pairs of contact portions 90 formed on the terminal assemblies 26. Each of the slots 68, 70 and 72, and the contact receiving chambers formed of the enlarged portions 56, 58 and 60, and 62, 64 and 66, are sufficiently long so that, after insertion of the contacts 28, the plug member 12 may be twisted or rotated relative to the receptacle 10, and the lug portions 96 of the terminals 28 will lock against an edge 18a (FIG. 7) of the top cylinder 18 thereby securing the plug member 12 with the receptacle 10. Additionally, each of the vertical leg portions 94 of the contacts 28 are provided with an aperture 98 located to receive the detents 92 when the plug member 12 is in assembled relation with the receptacle 10, as best illustrated in FIG. 3.

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 is therefore intended in the appended claims to cover all such modifications as fall within the true spirit and scope of this invention.

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

1. An electrical receptacle adapted to receive a complementary plug of the type having a plurality of elec-

trical contacts extending therefrom each having an arcuate-shaped cross section and each provided with a lug portion along its side edge adjacent one end thereof, said receptacle comprising a bottom cylinder, a center cylinder, and a top cylinder, said cylinders being assembled one upon the other and interlocked to prevent relative rotation therebetween, a plurality of terminal assemblies, each terminal assembly including a one piece terminal clamp member having a base portion and a pair of resiliently spaced contacts of arcuate-shaped cross section and adapted to receive one of the first mentioned contacts therebetween, and additionally having a terminal portion and a lead wire secured to each terminal portion, said bottom cylinder having a plurality of recesses formed in its inner end, each of said recesses being complementary to said base portion of said clamp member and having an opening through said bottom cylinder communicating with each recess, one of said terminal assemblies being positioned with its base portion in said recess and its lead wire extending through said opening, said center cylinder having a plurality of slots extending therethrough communicating with the first mentioned recesses and forming contact receiving chambers at least partially enclosing the last mentioned contacts and adapted to receive the first mentioned contacts, said center cylinder extending partially over the portion of said base portions of said terminal assemblies positioned in the first mentioned recesses to lock said terminal assemblies in position, said top cylinder having a plurality of entrance slots adapted to receive said first mentioned contacts and at least partially aligned with said last mentioned contacts, at least one of the last two mentioned cylinders having portions communicating with said slots and terminating below the upper surface of said top cylinder and adapted to receive said lug portion whereby said receptacle is adapted to lockingly engage said plug, a mounting flange secured between the last two-mentioned cylinders, and means securing said cylinders in assembled relation.

2. An electrical receptacle as set forth in claim 1 above wherein said cylinders and said flange are provided with interlocking means preventing relative rotation thereof, and wherein at least two of said slots are of a different size so that said receptacle is adapted to receive said plugs in only one position thereby providing a polarized receptacle.

3. 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 portion 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 arcuate-shaped contact entrance slot extending from said contact receiving chamber through the other end of said assembly; and a plurality of terminal members, each including a one piece terminal clamp member having a U-shaped resilient base clamp portion including a pair of legs and a bight portion, and having a pair of resiliently spaced contacts extending from adjacent edges of the legs in a first direction from the base portion, each of said members additionally including a terminal portion extending from the edge of one of said legs in the opposite direction, a lead wire, and a compression ring securing the lead wire to said terminal portion; one of said terminal assemblies being positioned in each of said sets of openings with said base portion being positioned in a complementary recess in one of said cylinders and held in said recess by an adjacent one of said cylinders so that said lead wire extends through said lead wire receiving opening with said contact extending toward said slots.

4. An electrical receptacle comprising a plurality of 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

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said assembly, each set having an enlarged central portion 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 arcuate-shaped contact entrance slot extending from said contact receiving chamber through the other end of said assembly; and a plurality of terminal members, each including a one-piece terminal clamp member having a U-shaped resilient base clamp portion including a pair of legs and a bight portion, and having a pair of resiliently spaced contacts extending from adjacent edges of the legs in a first direction from the base portion, each of said members additionally including a terminal portion extending from the edge of one of said legs in the opposite direction, a lead wire, and a compression ring fixedly securing the lead wire to said terminal

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nal portion; one of said terminal assemblies being positioned in each of said sets of openings with said base portion being positioned in a complementary recess in one of said cylinders and held in said recess by an adjacent one of said cylinders so that said lead wire extends through said lead wire receiving opening with said contact extending toward said slots.

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