Oct. 17, 1967 J. F. DUFFIELD 3,348,221

INDICATOR LIGHT ASSEMBLY

Filed Dec. 14, 1964 3 Sheets-Sheet 1

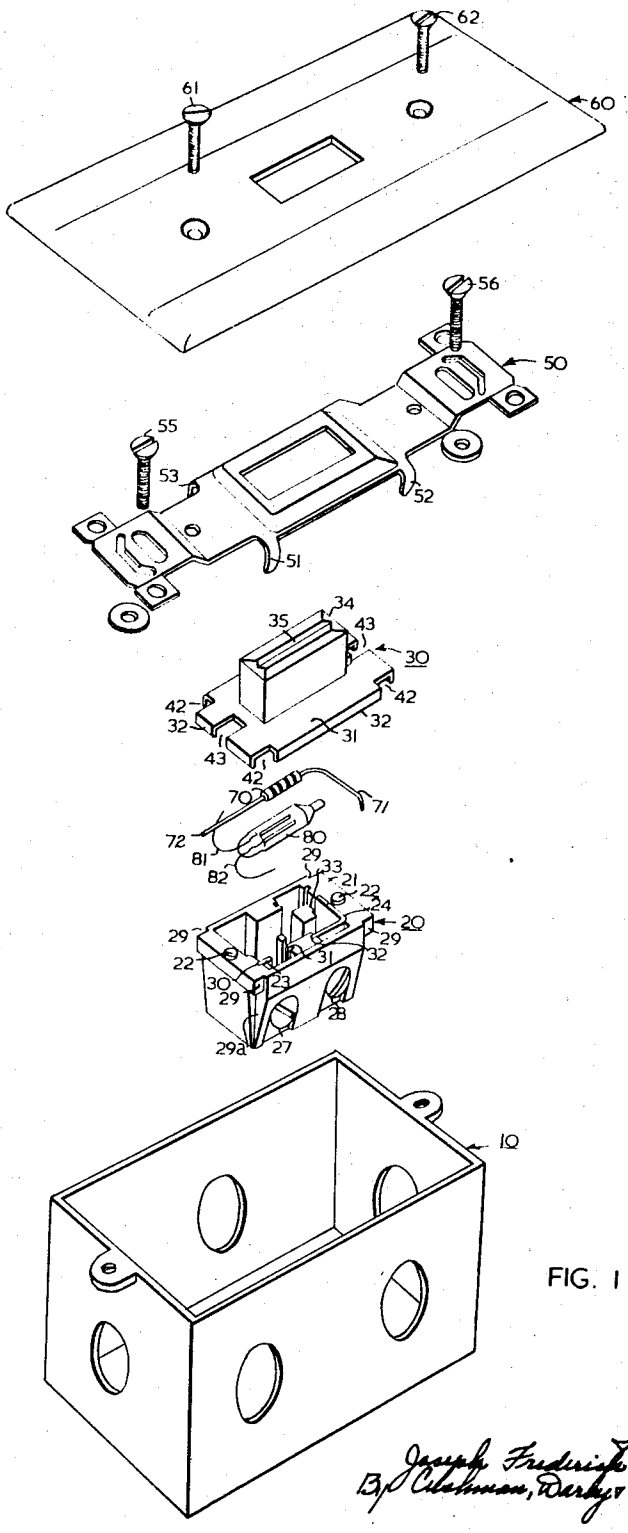


FIG. 1

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INDICATOR LIGHT ASSEMBLY

Filed Dec. 14, 1964 3 Sheets-Sheet 2

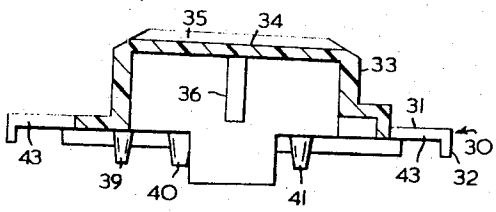


FIG. 2

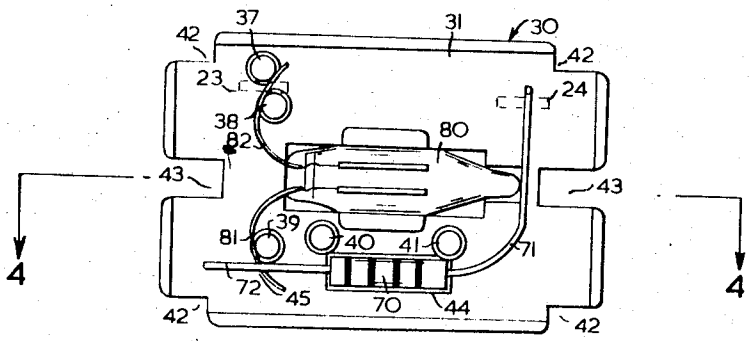


FIG. 3

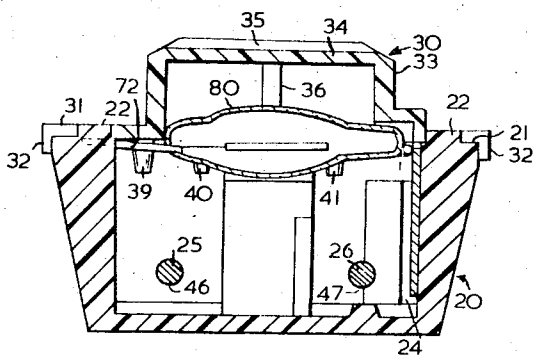


FIG. 4

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Oct. 17, 1967 J. F. DUFFIELD 3,348,221

INDICATOR LIGHT ASSEMBLY

Filed Dec. 14, 1964 3 Sheets-Sheet 3

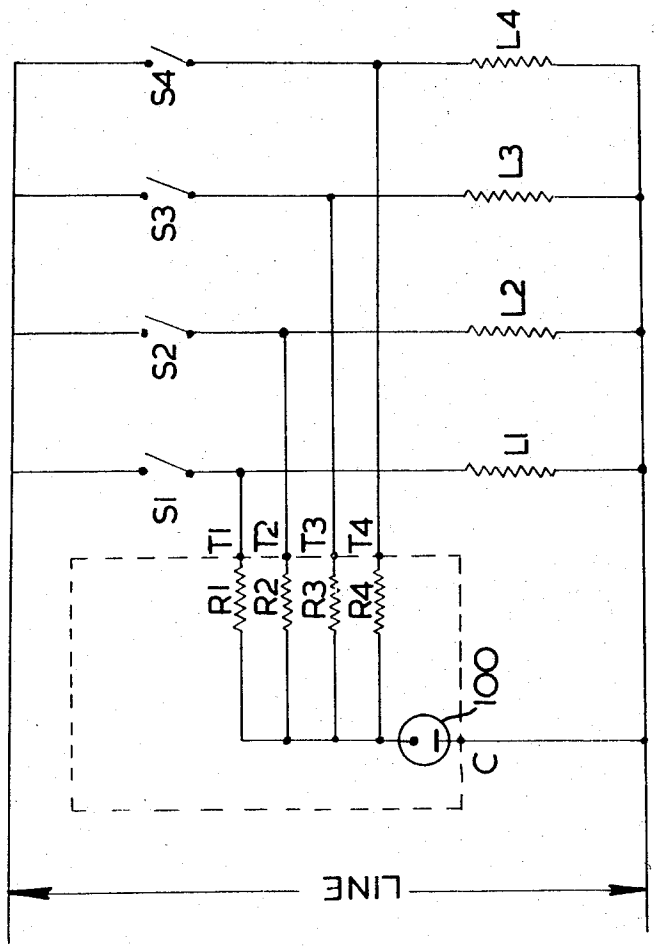


FIG. 5

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INDICATOR LIGHT ASSEMBLY

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Claims priority, application Canada, Nov. 9, 1964, 915,996
17 Claims. (Cl. 340—381)

The invention relates to electrical terminal connection means for low current devices. The invention has application in the productions of low cost electrical devices.

Conventional means for connecting wires to electrical devices or in joining pairs of wires together have included soldering, rivetting, welding, crimping, or the use of nuts, screws, clamping devices and the like. Quite frequently such conventional means have provided mechanical strength and complexity out of proportion to the current capacities envisaged. It has been found uneconomical to utilize such conventional connecting means in certain types of electrical devices due mainly to unnecessary metal content, the time required to complete the connection, and the resultant bulk of the completed electrical device. For example, in warning lamps, particularly of the neon type, the current consumed is insignificant so that not only may the connections be of very small current carrying capacity, but the total volume of the neon lamp holder may be much smaller than hitherto. Conventional connecting means have thus far impeded any attempts to simplify such devices, to reduce the size and the cost of production thereof.

It is an object of one aspect of this invention to provide a low current electrical connector.

According to this aspect of the invention there is provided an electrical connector for use with conductors carrying relatively small currents, said connector comprising: a first insulating member having a surface thereon upon which there are defined discrete conductor receiving regions and a plurality of conductor positioning posts protruding from said surface, a second insulating member having projections extending therefrom, said projections being adapted, on assembly with item (i) to overlay said regions, and, clamping means for tightly pressing and retaining said items (i) and (ii) in close engagement after said assembly.

It is an object of another aspect of this invention to provide a lampholder.

According to this further aspect of the invention to provide a lampholder comprising: a lens member including; a hollow portion having an opening at one end for receiving a lamp, a cap enclosing the other end, a flange extending outwardly from said hollow portion adjacent the said one end, at least one conductor positioning post extending from said flange, at least one conductor clamping region on said flange, said lens being formed of a light transmitting insulating material, a terminal block adapted, on assembly, for engagement with said flange of said lens, said block including; a pair of contacts, at least one of which is adapted to engage said clamping region, said pair of contacts having terminal means thereon for connecting said contacts into an electric circuit, said terminal block being formed of insulating material, and, clamping means adapted, on assembly, to maintain items (i) and (ii) in tight interengagement.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings, in which:

FIG. 1 is an exploded view, of a neon lamp assembly, a receptacle base, and a cover plate,

FIG. 2 is a side view, in section, of a lamp lens,

FIG. 3 is an inverted plan view of the lamp lens, with a neon lamp and resistor in position, and,

FIG. 4 is a side view, in section, taken along the line 4—4 in FIG. 3, showing the lens, lamp, and terminal block assembly,

FIG. 5 shows a wiring diagram wherein a single neon indicates energisation of one or more circuits.

Referring to FIG. 1 where is shown a receptacle base **10**, a terminal block **20**, a lens **30**, a yoke **50**, and a cover plate **60**.

Referring also to FIGS. 2 and 3, the lens is a one-piece molding having a flange **31**, which flange has a downwardly extending peripheral lip **32**.

A hollow portion **33** extends upwardly from the flange and the hollow portion **33** is enclosed by a top portion **34**. The top portion has prismatic formations **35** molded therein adapted to disperse light passing therethrough. Extending downwardly from the roof into the hollow portion **32** is a lamp positioning rib **36**.

From underside of the flange **31**, there extends downwardly, five posts **37**, **38**, **39**, **40** and **41**, which are of conical formation. Recesses **42** are formed in the four corners and recesses **43** are formed in the ends of the flange **31**. The flange **31** includes an aperture **44** adapted to receive a resistor to be described. The lens is formed in any suitable transparent or translucent material.

The terminal block **20** is hollow and formed of insulating material and includes a top surface **21** from which a pair of posts **22** project upwardly therefrom. The terminal block **20** includes a pair of apertures **46** and **47** for receiving terminal screws to be described, and further includes recesses **29** in the four corners thereof. Four flutes **29***a* are aligned with the recesses **29** in the four corners of the block **20**, said flutes being adapted to receive tabs as will be described. Located within the hollow block **20** are a first contact member **23** and a second contact member **24**, both of said contacts protruding a very slight distance above the top surface **21**. The contact members are drilled and threaded at their lower ends to receive, on assembly through apertures **46** and **47** threaded shanks **25** and **26** of a pair of terminal screws **27** and **28**. Contact member **23** is of rectangular cross-section adjacent said top surface **21** and contact member **24** is of angular cross-section at the same top surface **21**. The contact members **23** and **24** are maintained against lateral movement by grooves **30**, **21**, **32** and **33** formed on the inside of the hollow terminal block **20** into which the said contacts are received.

The yoke **50** is of conventional design excepting that it includes four downwardly projecting tabs, three of which are shown in FIG. 1 at **51**, **52** and **53**. A pair of screws **55** and **56** are provided for use during assembly as will be described.

Receptacle base **10** is a standard item, as is the wall plate **60**, for which in the latter case, a pair of screws **61** and **62** are provided for assembly purposes.

The remaining items comprise a resistor **70** having leads **71** and **72** and a neon lamp **80** having leads **81** and **82**.

In operation the neon lamp **80** is placed in position in the opening in the hollow portion **33** of the lens **30** so as to abut against the rib **36**. Lead **81** is then bent sideways so as to extend transversely across the underside of the flange **31** and abut against post **39** as shown in FIG. 3. Lead **82** of the neon lamp **80** is likewise bent sidewards so as to extend across the underside of the flange **31** and to pass between posts **37** and **38**.

Resistor **70** is then positioned in the aperture **44** in the flange **31** of the lens **30**. Lead **71** is then bent so as to extend transversely of the underside of the flange **31**. Lead **72** is left unbent so as to extend longitudinally of the underside of the flange **31** so that the lead **81** of the neon

lamp **80** is disposed between lead **72** and the underside of the flange **31**.

The terminal block **20** is then placed in juxtaposition with the underside of the lens **30** so that contact **23** engages lead **82** of the neon lamp **80**, contact **24** engages lead **71** of the resistor **70**, and the top surface **21** of the terminal block **20** engages lead **72** of the resistor **70**. The positions of contacts **23** and **24** after the assembly just described are indicated in dotted lines in FIG. 3. The position of lead **72** after the assembly is seen clearly in FIG. 4.

The yoke **50** is then placed over the assembled lens **30** and terminal block **20** whereby the four tabs **52** fit into associated recesses **42** in the lens **30** and the recesses **29** in the terminal block **20**. The tabs are then bent inwardly into the flutes **29***a* and subsequently crimped into tight engagement with the terminal block **20**. By this means lead **82** and contact **23**, lead **71** and contact **24**, and lead **81** and lead **72** are maintained in firm electrical contact with each other.

The yoke **50**, complete with the lens and terminal block, **30** and **20** respectively, is then fastened to the receptacle base **10** by screws **55** and **56** followed by the fitting of the cover plate **60** and fastening by means of screws **61** and **62** in the usual way.

FIG. 5 shows a wiring diagram for utilizing a lampholder, in accordance with the present invention, wherein the lampholder may contain a single neon lamp **100** and associated separate resistors **R1–R4** for indicating energization of four separate load circuits **L1–L4**, controlled by switch **S1–S4**. In this embodiment the terminal block has a common terminal C and four load circuit terminals **T1–T4**. Closure of one or more of switches **S1–S4** will cause the neon to light-up. Such an arrangement finds application in control panels, electric cooking stoves, and the like.

While the preferred embodiment has been described with reference to a neon lamp it will be obvious to those skilled in the art that the joining of conductors, with or without associated components, is rendered quick in operation, relatively compact, and inexpensive by the above disclosed invention.

It will be further appreciated that in the preferred embodiment standard items have been used in most cases, i.e. receptacle base, yoke, and wall plate. The terminal block is also identical to a switch terminal block and enables illustrated embodiment to be made without the need for a special terminal block thus enabling a particularly inexpensive product to be made.

The embodiments of the invention in which an exclusive property of privilege is claimed are defined as follows:

1. In an electrical connector formed by a pair of insulated body members to be assembled, including an electrical element having a plurality of leads emanating therefrom, said element being disposed within a cavity in the assembled body members, said leads being positioned in at least one of said insulated body members, and being connected to complete an electrical circuit, the improvement comprising:

locating elements for positioning and retaining the leads of said electrical element in one of said associated body members prior to assembly of said body members,

including means to retain said electrical element in said body member during assembly of said body members, and

means to make electrical connections to said leads upon assembly to said body members.

2. A connector in accordance with claim **1** wherein said locating elements comprise posts protruding into said cavity.

3. A connector in accordance with claim **2** wherein said electrical element is a neon lamp.

4. A connector is accordance with claim **2** wherein said electrical element is a neon lamp and further including an electrical resistor.

5. An electrical connector for use with electrical means having conductive leads carrying relatively small currents, said connector enclosing said means and comprising:

(i) a first insulating member having a surface thereon upon which there are defined discrete lead receiving regions and a plurality of leads positioning posts protruding from said surface, and,

(ii) a second insulating member having projections extending therefrom, said projections being adapted, on assembly with said first insulating member to overlay said regions.

6. The connector defined in claim **5** wherein said discrete regions are adapted to receive at least two conductive leads disposed one upon the other in electrical contact.

7. The connector defined in claim **5** wherein said discrete regions are adapted to receive at least two leads disposed one upon the other and wherein at least one of said leads is maintained against lateral movement by at least one of said posts.

8. The connector defined in claim **5** wherein at least one of said projections is a contact member.

9. The connector defined in claim **5** wherein all of said projections are separate contact members.

10. The connector defined in claim **5** further including clamping means for tightly pressing and retaining said first and second insulating members in close engagement after assembly.

11. The connector defined in claim **10** wherein said clamping means includes a substantially non-resilient metal member having at least two crimping tabs.

12. The connector defined in claim **5** wherein at least one of said projections is a contact member and wherein said first insulating member is formed in a light transmitting material, and further includes a lamp receiving aperture, said connector further includes a lamp in said aperture, said lamp having a pair of leads at least one of which is located in said discrete region, said one lead being disposed in electrical contact with said contact member.

13. The connector defined in claim **5** wherein at least two of said projections are contact members and wherein said first insulating member is formed in a light transmitting material, and further includes a lamp receiving aperture, said connector further including a lamp in said aperture said lamp having a pair of leads, one lead which is located in a first of said discrete regions, the other lead of which is located in a second of said discrete regions, said first and second leads being engaged, on assembly, with individual ones of said contact members.

14. A lampholder comprising:

(i) a lens member including;

(a) a hollow portion having an opening at one end for receiving a lamp,

(b) a cap enclosing the other end,

(c) a flange extending outwardly from said hollow portion adjacent the said one end,

(d) at least one conductor positioning post extending from said flange,

(e) at least one conductor clamping region on said flange, said lens being formed of a light transmitting insulating material,

(ii) a terminal block adapted, on assembly, for engagement with said flange of said lens, said block including;

(a) a pair of contacts, at least one of which is adapted to engage said clamping region, said pair of contacts having terminal means thereon for connecting said contacts into an electric circuit, said terminal block being formed of insulating material, and,

(iii) clamping means adapted, on assembly, to maintain items (i) and (ii) in tight interengagement.

15. The lampholder defined in claim 14 wherein said flange includes a resistor receiving aperture therein.

16. The lampholder defined in claim 14 wherein said cap has prismatic formations therein adapted to disperse light passing therethrough.

17. A neon-lamp assembly comprising:

(i) a lens member including;

(a) a hollow portion having an opening at one end for receiving said neon lamp,

(b) a cap enclosing the other end of said hollow portion said cap having prismatic formations therein adapted to disperse any light passing therethrough,

(c) a flange extending outwardly from side hollow portion adjacent said one end,

(d) a plurality of conductor positioning posts extending from said flange,

(e) a plurality of conductor clamping regions on said flange, said lens being formed of a light transmitting material,

(ii) a terminal block adapted, on assembly, for engagement with said flange, said block being formed of an insulating material, said block including;

(a) a pair of contacts each having a projection, said projections overlaying individual ones of said conductor clamping regions, each of said pair of contacts having terminal means thereon for connecting said contacts into an electrical circuit,

(iii) a neon lamp having a pair of leads each lead being disposed, on assembly, in juxtaposition with one of said conductors clamping regions on said flange and retained against lateral movement by said posts, and,

(iv) a yoke having four tabs extending therefrom and a lens receiving aperture therein, said yoke, on assembly, receiving said lens in said aperture, said tabs, in operation, serving to hold said terminal block and said lens in close engagement with one another thereby to maintain said leads in electrical contact with said contacts.

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