April 12, 1955 M. J. MARKS 2,706,266

MULTIPLE ELECTRICAL CONDUCTOR CONNECTOR

Filed March 27, 1953

FIG. 1

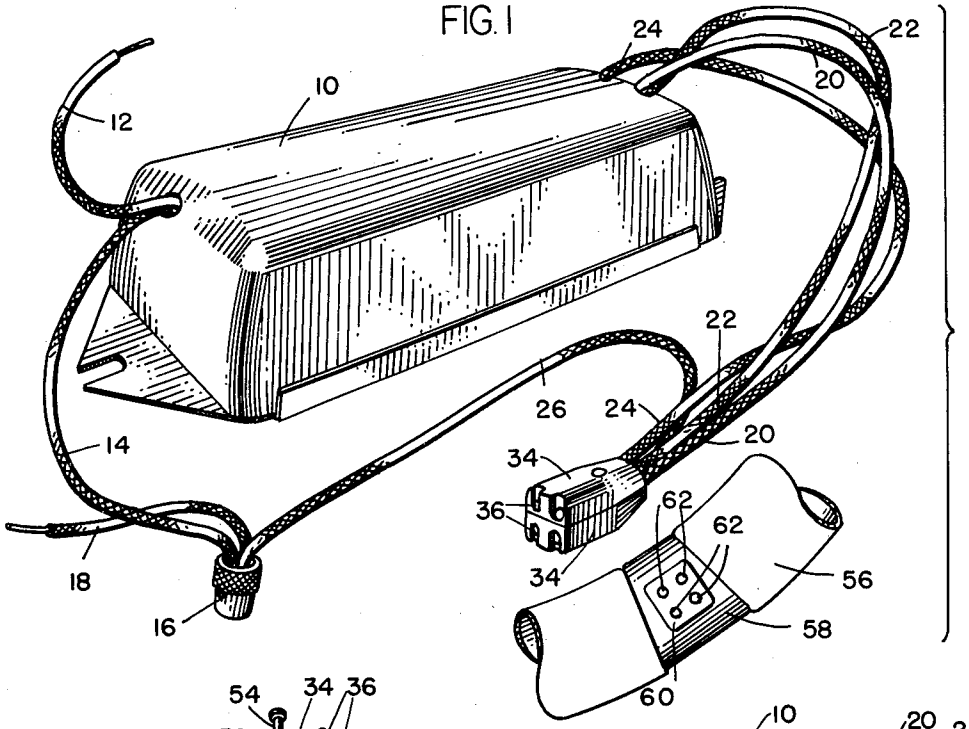
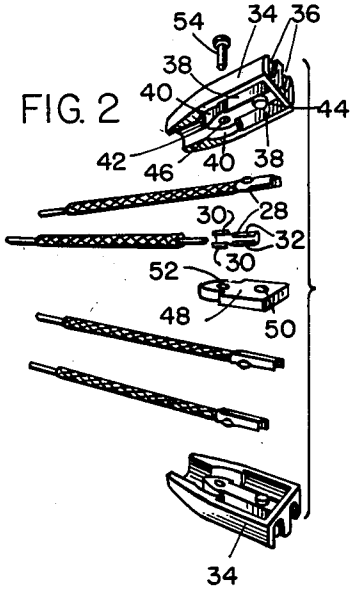


FIG. 2



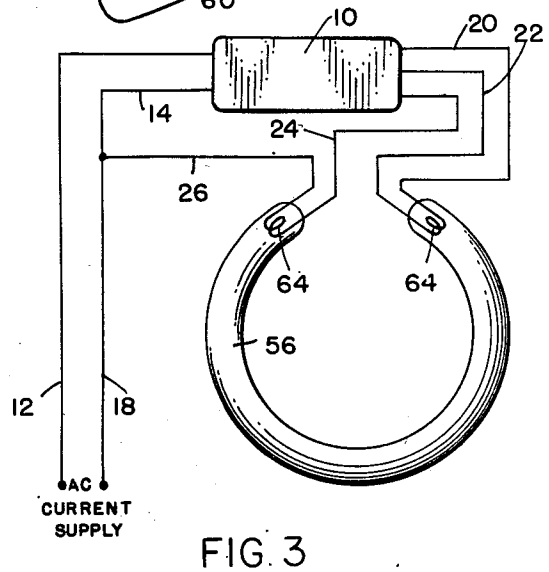


FIG. 3

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United States Patent Office 2,706,266 Patented Apr. 12, 1955

2,706,266

MULTIPLE ELECTRICAL CONDUCTOR CONNECTOR

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Application March 27, 1953, Serial No. 344,997

5 Claims. (Cl. 315—98)

This invention relates to a connector for a plurality of electrical conductors and is more particularly described as a prewired connector for a plurality of electrical conductors which extend from a source of current supply to a ballast or transformer and then to a lighting fixture of the fluorescent tube type.

In providing an electrical connection in an electric lighting fixture between the source of current supply, the lamp (or lamps) itself and the intermediate lighting transformer or ballast, a great deal of time is consumed not only in attaching the wires or conductors to the separate parts but actually in making the prepared connections between the transformer and a lamp once the conductors have been attached. For even connecting a single lamp, a number of different conductors and connections are required and it is not easy for an experienced person to make the right connections.

The present invention provides a multiple connector which is prewired and properly connected to the transformer of a lighting fixture for a fluorescent lamp such that it is necessary only to connect two projecting terminals to a source of current supply and to connect the several conductors by means of a single plug to the terminals of a fluorescent tube lamp.

An important object of the invention is to provide a compact connector plug adapted to closely receive and to separate a plurality of conductors which extend from a source of supply and from a transformer for the purpose of attaching the conductors to the lamp of a lighting fixture.

A further object of the invention is to provide a prewired assembly of conductors from a source of supply and a current transformer to a plug of compact form adapted to engage the adjacent terminals of a tubular lamp.

A still further object of the invention is to provide a prewired assembly of conductors from a current transformer adapted to engage the adjacent terminals of a circular fluorescent tube lamp.

Other objects of the invention will appear in the specification and will be apparent from the accompanying drawings in which:

Fig. 1 is a perspective view illustrating a prewired multiple connector in connection with a current transformer and adapted to be applied to the ends of a circular tube lamp.

Fig. 2 is an exploded view of the multiple terminal plug connector as shown in Fig. 1; and

Fig. 3 is a circuit diagram of a standard circular tube multiple connector in accordance with Fig. 1.

In wiring electrical fixtures, a great amount of time is consumed in making the electrical connections unless the attachment and connection of such conductors is carried out by marking the conductors in a certain particular manner so that they may be connected to the proper terminals with the least possible effort.

In the present invention, this operation is carried out by extending short conductors of different colors from the ends of the current transformer which are connected to a multiple plug in a predetermined arrangement, and other connectors are joined by a screw type connector which engages the bare ends of a plurality of conductors.

Referring now more particularly to the drawings, a current transformer or ballast **10** as commonly used in connection with fluorescent tube lamps has an enclosing casing through which projects the ends of a number of conductors.

These conductors are covered wires preferably of the

stranded type and the extremities of the conductors each have a bare portion extending therefrom for making rapid connections.

One conductor **12** is adapted to be connected to one terminal of an A.–C. current supply. Another conductor **14** extends from the same end of the ballast with its extremity inserted in a screw type wire end connector **16** and from this connector extends a conductor **18** which may be connected to the other terminal of an A.–C. current supply.

At the other end of the ballast casing, three conductors **20, 22** and **24** project sufficiently to provide free wire ends and with them is joined a similar wire end of a conductor **26**, the other end of which is inserted in the wire end connector **16** and joined electrically with the other conductors **14** and **18**. The wire ends of the four conductors **20, 22, 24** and **26** are each engaged by a fastening clip **28** made of thin sheet metal such as brass or copper and having two upstanding spaced lips **30** adapted to receive the bare end of the conductor wire therein and to be folded tightly over the end of the wire making a firm electrical connection. At the other end of each clip are sides **32** folded partially inward to provide a somewhat triangular sleeve open at one side. These clips are small in size, adapted to be received within two matching plug members **34** composed of insulating material such as porcelain or other plastic material. At the end of each plug member are two openings **36** communicating with an interior recess **38** adapted to receive one of the clips **28** with the end of a conductor wire attached thereto, the other part of the member having a passage **40** leading from each of the recesses **38** and joining in a common rear outlet **42** through which the covered portions of the conductors may extend. In each member **34** is a central partition having a projection **44** near one end and an opening **46** near the center so that when the two matching plug parts are put together, an insulating and spacing washer **48** may be placed between them, the washer having a hole **50** at one end for engaging the projections **44** on opposite sides and having a hole **52** at the other end through which a fastening rivet or screw **54** may be inserted to tightly bind the plug parts, and the partition **48** together and to hold the ends of the wires tightly in their recesses and connected to their clips **32**.

The multiple end plug connector thus described is extremely small and compact, the extremities of the conductors are easily attached to the fastening clips **28** and the sides **32** of the clips which are accessible only through the end openings **36** are sufficiently resilient to stand a considerable expansion and still to make a tight electrical connection.

With this construction, the ballast and its connecting conductors may all be pre-wired at a factory or shop so that it is necessary only to connect the terminal wires **12** and **18** to the proper terminals and to connect the multiple plug to a lamp or some other electrical device for using the current. In connecting this multiple plug to a fluorescent electric lamp **56** of the circular tubular type, a small segmental insulated connector **58** is interposed between the adjacent ends of the tube. From a recess **60** at one side of the connector **58**, there are four outwardly projecting terminal pins or connectors **62** which are spaced apart in a predetermined manner in accordance with the openings **36** at the end of the multiple plug connector. The spacing of the pins **62** determines the manner in which the multiple terminal is applied thereto, the pins projecting through the end holes **36** and engaging the clips **28** within the multiple connector.

The result of this connection is that lighting coils **64** at the ends of the tube **56** are properly energized by the conductors **20, 22, 24** and **26** as indicated in the wiring diagram in Fig. 3.

With this construction, the wiring and assembly of the ballast or transformer may be completed at a shop or factory by ordinary assemblers or workmen so that it is not necessary to take the time of relatively high-priced labor to do this work when attaching the ballast to a lighting fixture. With this complete assembly, it is necessary only to secure the ballast tightly in place in the space ordinarily provided for it, and to extend the terminal connectors **12** and **18** for connection with these parts;

and to apply the multiple plug connector to the joint terminal of a lighting fixture of the tubular circle type. Although the multiple plug connector is shown with four connections only a similar type of plug connector may be provided for additional conductors. However, for a plurality of circle lamps in one fixture, it is preferable to provide a four-way multiple plug connector for each lamp which means that a divided connection would be provided for each of the conductors leading to the multiple plug connector as shown in Fig. 1.

While a preferred construction has been described in some detail, it should be regarded by way of illustration and example rather than as a restriction or limitation thereof, as many changes in the construction, combination and arrangement of the parts may be made without departing from the spirit and scope of the invention.

I claim:

1. In combination with a tubular low pressure gaseous discharge lamp which requires two contact connections at each end of the tube; a transformer ballast and means for prewiring the leads from the ballast for a source of current supply and also to supply current from the ballast to both ends of a tubular gaseous discharge lamp, said means comprising two leads extending outwardly from the ballast for connection to a source of current supply; three conductors extending outwardly from the ballast, and a fourth conductor one end of which is connected to and extends from one of the current supply leads to a location remote from the ballast and adjacent the outer ends of the three conductors, the four said conductors having separate terminals to which each is connected, and the low pressure gaseous discharge lamp having cooperating terminals receiving and connected to all of said four conductor terminals.

2. The combination in accordance with claim 1 in which all of the four conductors have terminals for engagement with a lamp having a combining plug connector in which they are prewired prior to the connection of the ballast in a lighting fixture and same lamp has four terminals arranged adjacent to each other and in a pattern to engage the four terminals of the plug connector.

3. A lighting fixture combination in accordance with claim 2, in which the tubular lamp is of the circular variety with the extremities of the lamp adjacent to each other so that the four terminals of the lamp are close together, and the four terminals of the plug connector are arranged in a pattern similar to that of the lamp terminals so that they may all be connected thereto and disconnected therefrom at the same time with the plug connector.

4. In a lighting fixture combination in accordance with claim 1, the prewired connection between one of the current supply leads and the outer end of the said fourth conductor consisting of the bare ends of the wires twisted together and another wire having one bare end twisted together with and at the junction of the other two, and having a free end forming an extension of the lead wire to which it is connected and completing one terminal lead for connection to a source of current supply, and a screw wire end connector threaded upon the twisted ends of the three wires thus joined for permanently connecting them together.

5. In a lighting fixture in accordance with claim 2, the plug connector comprising a pair of similar insulating members with holes in one end leading to recesses open at one face of each member, the recesses being separated by a partition having a projection extending outwardly therefrom and a recess through the member, a bent wire engaging clip seated in each of said recesses and having triangularly bent ends opposite each end hole of the member, the other end of each clip having spaced lips adapted to receive the bare end of the conductor wire therebetween, and the lips foldable tightly over the end of the wire making a firm electrical connection, the other end of the member having a single opening communicating with the recesses on both sides of its partition, the connected portion of the wire extending through the other end of the member, an insulating partition having perforations therethrough and seated between two plug connecting members placed oppositely together, the projections of the members fitting in opposite sides of one of the recesses of the partition, and fastening means inserted through the said holes of the members and through the hole of the partition to secure the single plug tightly together with the holes extending to the recesses of the plug compactly arranged in close relation to each other, but all the wire ends disposed within the plug connector and insulated from each other.

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