

[54] **CONNECTOR FOR LAMP SOCKET**
[72] Inventor: **James N. Dupree**, South El Monte, Calif.
[73] Assignee: **Dupree, Inc.**, El Monte, Calif.
[22] Filed: **Sept. 2, 1970**
[21] Appl. No.: **69,049**

[52] U.S. Cl.**339/61 L, 339/91 L, 339/129, 339/176 L**
[51] Int. Cl.**H01r 33/34**
[58] Field of Search**339/59-63, 91, 339/176, 191, 192, 211, 213, 129, 130**

[56] **References Cited**
UNITED STATES PATENTS
3,484,736 12/1969 Wyse**339/61 M**

2,563,762 8/1951 Uline et al.**339/60 M**
2,615,951 10/1952 Klostermann**339/60 M**
3,040,285 6/1962 Stanley**339/60 R**

Primary Examiner—Joseph H. McGlynn
Attorney—Harris, Kiech, Russell & Kern

[57] **ABSTRACT**
An electrical connector for connecting wire conductors to lamp sockets, such as those used for edge lighted panels. A connector comprising an insulating body and a conductor contact carried within the body, with the contact having a crimp wire receiver on one end and a split barrel terminal receiver on the other. The insulating body is a unitary resilient plastic member which is a push fit onto the socket and which carries the contact into sliding engagement with the conductor pin of the socket.

1 Claim, 5 Drawing Figures

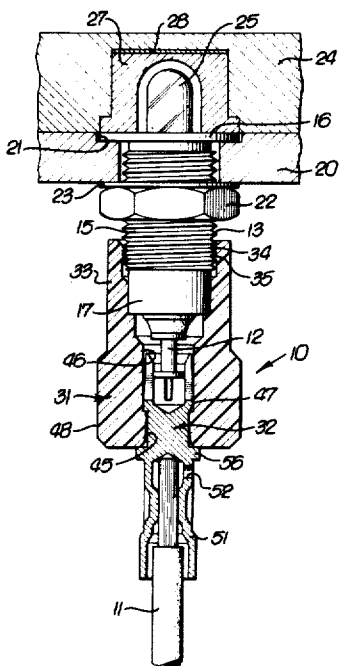


FIG. 1.

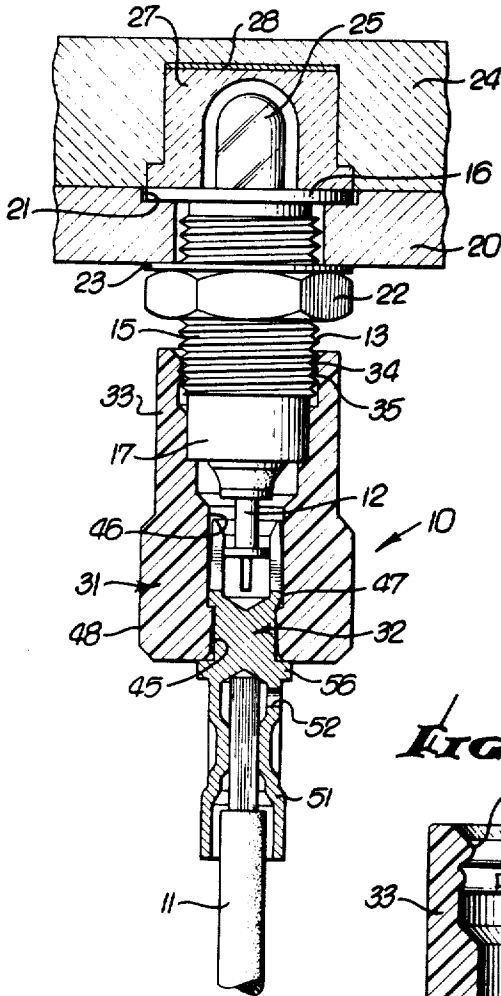


FIG. 2.

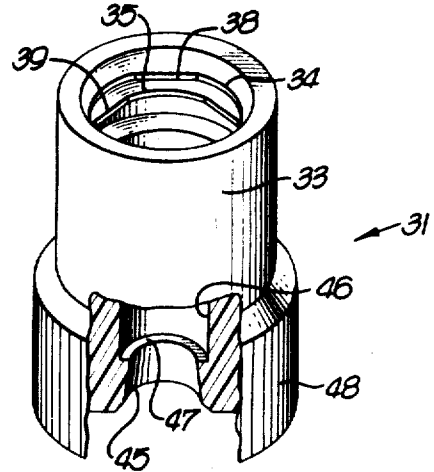


FIG. 3.

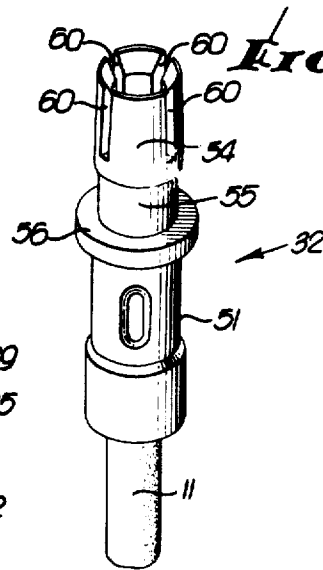


FIG. 5.

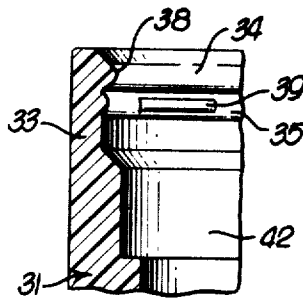
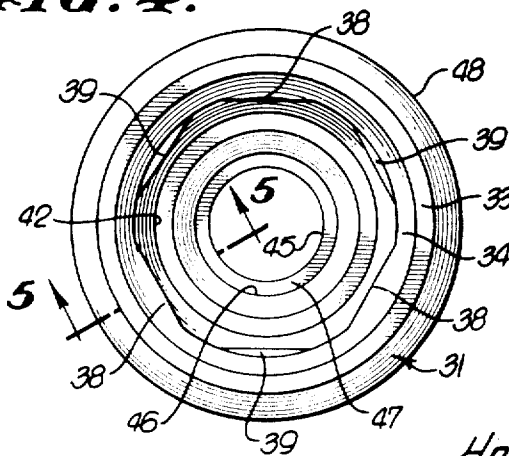


FIG. 4.



INVENTOR.
JAMES N. DUPREE
By His Attorneys

HARRIS, KIECH, RUSSELL & KERN

CONNECTOR FOR LAMP SOCKET

This invention relates to electrical connectors and in particular, to connectors suitable for connecting a cable harness to the sockets of instrument panel lights. A typical aircraft instrument panel includes a sandwich of a plastic sheet and a support plate. The front surface of the plastic sheet is opaque and various legends are cut into the opaque surface. Electric lamps are positioned within the panel providing edge lighting for illuminating the legends. The sockets for the lamps are mounted in the support plate and project from the rear of the panel. In the past, wire connections have been made to the sockets by wrapping and/or soldering. An instrument panel will have a large number of such connections which normally are made after the panel is installed in the aircraft. Performing the wire conductor connection to each of the lamp sockets is a tedious and time consuming operation and one with a high possibility of error and/or poor connection.

It is an object of the present invention to provide a new and improved electrical connector which will permit a push type of installation in connecting wire conductors to lamp sockets and the like. A further object is to provide such a connector permitting rapid installation of a cable with many such connectors incorporated therein. An additional object is to provide such a connector which does not require crimping or soldering or handling of the individual wires at the time the installation and connection is achieved.

A particular object of the invention is to provide a new and improved connector which is reliable and inexpensive and which will withstand high vibration and shock without affecting the electrical circuitry.

The electrical connector comprises an insulating body with a conducting contact carried therein, with the insulating body being a push fit into the socket housing and forcing the conducting contact into engagement with the conducting pin of the socket, with the wire conductor being joined to the conducting contact.

The invention also comprises novel details of construction and arrangements of parts, which will more fully appear in the course of the following description. The drawing merely shows and the description merely describes a preferred embodiment of the present invention which is given by way of illustration or example.

In the drawing:

FIG. 1 is a vertical sectional view of a portion of an edge lighted panel with lamp, socket and connector incorporating a preferred embodiment of the present invention;

FIG. 2 is an enlarged isometric view of the connector body of FIG. 1;

FIG. 3 is an enlarged isometric view of the connector contact of FIG. 1;

FIG. 4 is an enlarged end view of the body of FIG. 2; and

FIG. 5 is a partial sectional view taken along line 5—5 of FIG. 4.

In FIG. 1, the connector 10 of the invention is coupling a wire conductor 11 to the center pin 12 of a socket 13. The lamp socket 13 may be conventional in design and a typical socket is illustrated in U.S. Pat. No. 3,506,943. The socket includes a housing with a threaded central portion 15, a flange 16 at one end and a cylindrical portion 17 at the other end, with the pin 12 centrally positioned within the housing and electrically insulated therefrom. The socket is mounted in an opening in a metal plate 20 with the flange 16 disposed in a counterbore 21, and is clamped in place by a nut 22 on the threaded portion 15, with a washer 23 between the nut and the plate.

The plate 20 is mounted with a plastic sheet 24 in a conventional manner to form an edge lighted panel, with a bulb 25 positioned in the socket and projecting into an opening in the plastic sheet. The plastic sheet 24 typically is clear and a cap 27 of colored plastic may be disposed within the opening in the sheet 24 to provide a desired color for the light. A metal plate 28 may be positioned between the cap 27 and the plastic sheet 24 to serve as a heat sink aiding dissipation of heat from

the light bulb 25 and also in dispersing illumination from the lamp to prevent a high intensity spot over the bulb. While a specific form of socket and edge lighted panel are illustrated in FIG. 1, it is realized that the present invention is not restricted to use with such socket and panel, and that the connector may be used with a variety of sockets and/or panels.

The connector 10 is formed of a body 31 with a contact 32 carried therein. The body 31 is a unitary electrically nonconducting member formed of a slightly resilient material, and preferably it is a molded plastic member formed of a polyamide such as nylon. Polyamides are characterized by toughness, flexibility, high elongation and elastic recovery, and good resistance to hydrocarbon solvents. A preferred material is a nylon type 6, such as Du Pont Zytel NC-10 and Gulf Spencer 401-AX. We use nylon. Other resilient thermoplastic molding materials such as polytetrafluoroethylene and polycarbonates would be suitable. The resilient characteristic is desired because of the interference fits designed into the connector as will be described below.

The body 31 has a sleeve 33 at one end for sliding over the socket 13, with the interior of the sleeve 33 being an interference fit with the threaded portion 15 of the socket.

In the preferred embodiment illustrated, annular ridges 34, 35 are provided on the inner wall of the sleeve 33. The inside diameters of the ridges 34, 35 are less than the outside diameter of the threads of the socket so that an interference fit is achieved as the connector is pushed onto the socket. Since the body 31 is made of a resilient material, the ridges 34, 35 will deform locally permitting installation of the connector onto the socket.

The grip of the connector body on the socket is improved by providing chordal or flat sections on one or both of the annular ridges. In the embodiment illustrated, the three chordal sections 38 are equally spaced about the ridge 34 and three chordal sections 39 are equally spaced about the ridge 35 and three chordal sections 39 are equally spaced about the ridge 35 and are offset or rotated axially from the sections of the ridge 34 so that the six sections are equally spaced, as seen in FIG. 4.

In the preferred embodiment illustrated, an inner portion 42 is provided in the sleeve 33 with a cylindrical opening for engagement with the end portion 17 of the socket. Abutment of the end of the socket at the bottom of the cylindrical portion 42 serves as a limit stop when the connector is pushed onto the socket. The telescoping engagement of the two cylindrical surfaces maintains the components in alignment and lessens strain on the connection.

An opening is provided in the lower end of the body 31 for receiving the contact 32 and in the preferred embodiment includes an outer tapered section 45 converging toward an inner section 46 of increased diameter, with the sections meeting at an annular shoulder 47. A knurled shoulder 48 may be provided on the body for improved manual gripping during installation and removal of the connector.

The contact 32 is made of metal, typically brass, and has a tubular outer end 51 designed for receiving a wire conductor 11. A radial opening 52 permits visual inspection of the position of the conductor within the contact prior to fastening the conductor in place as by soldering or crimping, the latter being illustrated in FIGS. 1 and 3.

The contact 32 is designed to be a push fit into the body 31 and in the preferred embodiment illustrated the contact includes an outer tapered portion 54 which diverges toward an inner portion 55 of reduced diameter. A flange 56 serves as a stop for limiting entry of the contact into the body. The cooperating tapered surfaces of the contact portion 54 and the body opening 45 facilitate insertion of the contact into the body, with the resilient body expanding to permit passage of the contact portion 54 past the shoulder 47 of the body.

The outer portion 54 of the contact has a central opening for receiving the pin 12 of the socket. A pressure engagement is achieved by slotting or splitting the portion 54, as indicated at 60, with the opening being smaller than the pin so that the

tines formed by slotting will be forced outward as the connector is pushed onto the socket thereby achieving a pressure electrical connection. The bore of the inner section 46 of the body 31 preferably is sized to engage or nearly engage the outer portion 54 of the contact 32 and prevent undue spreading of the tines when pushed onto the socket pin 12.

In use, an electrical cable comprising a plurality of conductors such as the conductor 11 may be formed by conventional means. A contact 32 is affixed to each conductor as desired. In the embodiment illustrated, one conductor is crimped in a contact. However there are instances where two and three conductors are crimped in a single contact, depending upon the circuit requirements. The instrument panel with appropriately located sockets is assembled in the usual manner and may be installed in its final position. The body elements of the connectors may be assembled with the contacts prior to crimping the contacts on the conductors or may be attached afterwards as desired. The cable harness is now placed in its final position and each connector is pushed into the corresponding socket, thereby completing the installation. If it is desired to remove the installation, the connectors may be pulled off of the sockets.

Thus it is seen that the unique connector provides a quick, simple and reliable means for installing and removing cabling. Extensive testing has established that the resulting connections are both electrically and mechanically secure and are highly resistant to vibration over a wide range including that

normally encountered in aircraft installations. The push on connection permits incorporation of lighting wiring in the same harness with wiring for switches and other components, since wrapped and/or soldered connections are eliminated.

I claim:

1. In an electrical connector for connecting a conductor to a socket, with the socket having a conducting pin coaxially positioned within a housing having a threaded periphery, the combination of:

an insulating body and a conducting contact carried in said body,

said body comprising a unitary resilient plastic member having a sleeve at one end for sliding over said socket housing and being an interference fit with said threaded periphery and having an opening at the other end for receiving said contact,

said body sleeve including first and second axially spaced inwardly projecting annular ridges, with the inner diameters of said ridges less than the outer diameter of said housing threaded periphery and including a plurality of chordal sections in each of said ridges, with said sections of one ridge offset from said sections of the other ridge,

said contact comprising a metal shaft with means at one end for receiving a conductor and with means at the other end for engaging said socket pin.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,673,544 Dated June 27, 1972

Inventor(s) James N. Dupree

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Address of assignee should read "South El Monte".

Column 1: Line 27, delete "handling" (first occurrence) and
insert --any--;
Line 34, "into" should read --onto--.

Column 2: Line 14, "type" should be --Type--;
Lines 35 and 36, after "34" delete --and three
chordal sections 39 are equally spaced about
the ridge 34--.

Column 3: Line 19, "into" should be --onto--.

Signed and sealed this 6th day of March 1973.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents