



(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 84303125.3

(51) Int. Cl.³: H 01 R 13/66

(22) Date of filing: 09.05.84

(30) Priority: 31.05.83 GB 8314986

(71) Applicant: Starpoint Electrics Limited
188 Garth Road
Morden Surrey SM4 4NH(GB)

(43) Date of publication of application:
05.12.84 Bulletin 84/49

(72) Inventor: Partridge, David
11 Little Court
West Wickham Kent(GB)

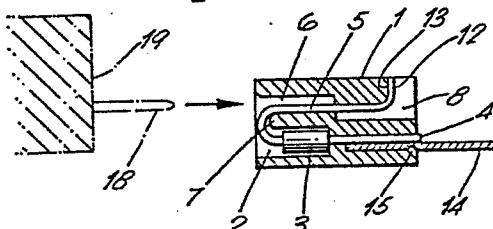
(84) Designated Contracting States:
AT DE FR GB IT NL

(74) Representative: Jennings, Guy Kenneth et al,
GILL JENNINGS & EVERY 53-64 Chancery Lane
London WC2A 1HN(GB)

(54) Diode mounting.

(57) An adapter for a small, panel-mounting lamp holder or other illuminated component having a pair of male terminals (18), the adapter being in the form of a self-contained unit (1) provided with male and female terminal arrangements (14, 6). The unit includes a diode (3) of which one lead (5) extends to the female terminal socket (6) which is designed to accept one of the male terminals (18) of the lamp holder and the other lead (4) of which is connected to the male terminal (14) to provide a connection point to an external circuit, thereby connecting the diode in series with the component without the need for any soldered connection.

Fig. 1.



STARPOINT ELECTRICS LIMITED

- 1 -

DIODE MOUNTING

This invention relates to multiplexing circuits and is particularly concerned with the mounting and connection of diodes in such circuits. For sake of example, the invention will be described in connection with multiplexing arrangements for lamps used in gaming or amusement machines, but it will be understood that it is applicable to multiplexing arrangements for small panel-mounted lamps in general.

The need for multiplexing in gaming machines arises from the relatively large number of small, panel-mounted lamps utilised in such machines, e.g. approximately one hundred, these being used to give what is termed "player appeal" on which, to a large extent, the success of such machines depends. Thus the areas which visually interface with the player are provided with selected and controlled illumination and even though all the lamps are unlikely to be illuminated at the same instant, the power consumed has grown relatively large. Since the lamps used are physically small and are typically rated at six or twelve volts, there is a need

for a power supply to convert the normal domestic input to the required voltage. As the number of lamps has grown, the power supply unit has also had to be enlarged, leading to extra expense, bulk and heat dissipation. Large numbers of lamps have also led to an increase in cable runs.

It is against this background that manufacturers have adopted multiplexing, i.e. the simultaneous transmission of several signals along a single path without any loss of identity of an individual signal. In order to prevent the mis-direction of currents in the multiplexing network, it is necessary to insert a diode in a series circuit with each lamp so as to allow the current necessary to give sufficient illumination to travel in a single direction only through the lamp. As a matter of convenience, it is desirable to attach the diode to the holder of each individual lamp.

Lamp holders and other illuminated components such as push buttons which have been designed specifically for multiplexing operation incorporate the diode internally as part of the component. However, many of the lamp holders and illuminated components used in amusement machines have not been designed specifically for multiplexing operation and a separate diode has to be fitted externally, involving a relatively expensive soldering operation.

According to the present invention, a diode is included in a self-contained adapter unit provided with male and female terminal arrangements, one lead of the

diode extending to the female terminal socket which is designed to accept one of the male terminals of the lamp holder or other component and the other lead being connected to the male terminal to provide a connection

5. point to an external circuit. In this way a diode can be connected in series circuit with a small lamp or other illuminated component merely by fitting it in position to the male terminal of the lamp and without the need for any separate soldering operation.

10. Preferably the diode is fitted in the adapter unit in such a way that the connections to the diode leads are dry connections, that is to say frictional or pressure connections, thereby further simplifying the assembly. For this purpose, the body of the unit may be

15. formed as a plastics moulding, in which one of the diode leads extends along the side of a recess in the body defining a socket for the reception of a male terminal of the lamp or other component and the other lead extends along the side of a passage within which the

20. male terminal of the unit is a force fit. The male terminal and the passage within which it fits may be formed with complementary inter-fitting portions which are brought into engagement when the terminal is forced into position, and may have a portion which inter-fits

25. with part of the moulding so as to hold the male terminal in position.

A construction of diode adapter unit in accordance with the invention will now be described by way of example, with reference to the accompanying drawings, in

30. which:-

Figure 1 is a longitudinal sectional view;

Figure 2 is an end view seen from the right of Figure 1;

Figure 3 is an underneath plan view; and

5. Figure 4 is a perspective view showing the adapter unit fitted to the male terminal of an illuminated push button designed for panel mounting.

Turning first to Figure 1, the body 1 of the adapter unit is formed as a plastics moulding having a recess 2 for the reception of a diode 3. One diode lead 4 extends in line with the body of the diode through a corresponding passage in the moulding, having been cut to length so that it reaches the right hand end of the body 1, as seen in Figure 1. The other lead 5 is bent 10. into a U-configuration prior to fitting into the body 1 and extends along a second recess 6 which is separated from the recess 2 by a partition 7. The free end of the lead 5 extends into a further recess 8 opening from the right hand end of the body 1, and after the diode has 15. been fitted, the end portion of the lead 5 is bent upwardly at 12 so as to fit against a shoulder 13 on the moulding and thus prevent withdrawal of the diode 3 to the left. The lead 4 is held firmly within its passage by insertion of the male terminal 14 of the adapter. 20. This is in the form of a flat tab which is inserted into a correspondingly shaped slot opening from the right hand end of the moulding 1, within which, in conjunction with the lead 4, it forms a force fit. Consequently, as 25. the tab 14 is inserted from the right, it forms a firm frictional connection with the lead 4 and is then held 30. in its inserted position by the inter-engagement between

a small ridge 15 on the moulding and a corresponding opening 16 (best seen in Figure 3) in the tab 14.

The tab 14 may, for example, be a standard 250 series tab, i.e. formed with a hole 17 for connection purposes. As seen in Figure 3, the tab 14 is symmetrical, being formed at its left hand end (received within the body of the moulding 1) with a duplicate opening 16' and a hole 17'. Although when assembled, these play no part in the function of the tab, the fact that the tab is symmetrical end for end means that either end can be fitted into the moulding 1 and the supply of tabs can therefore be bowl-fed for purposes of automatic assembly, since there is no need to discriminate between the two ends. Insertion of the tab both makes frictional contact with the lead 4 and further assists in anchoring the diode 3 in position within the moulding 1.

It will thus be understood that, when assembled, the tab 14 constitutes a male terminal for connection to the supply circuit and the recess 6, in conjunction with the lead 5, forms a female terminal socket for the reception of a male terminal 18 (shown in dotted lines in Figures 1 and 3) of a lamp or other illuminated component, the body of which is shown in dotted lines at 19. The terminal 18 forms a firm push fit in the recess 6 and thus both makes good frictional contact with the lead 5 and also holds the adapter unit as a whole firmly in position.

One particular application of the adapter is shown in Figure 4 where the adapter 1 is illustrated as fitted to an illuminated push button switch. The push button switch itself is a standard item comprising a push

button 21 with a translucent body portion 22 illuminated by an internal lamp (not seen). A male terminal connected in the lamp circuit is shown partly at 23, the remainder of the terminal being received in the 5. connection socket of the adapter 1. In other words, the adapter 1 is firmly pushed onto the terminal 23 and this serves both as a mounting for the diode within the adapter and, at the same time, makes a positive electrical connection to one lead of the diode. The 10. other lead of the diode is connected to the male terminal 14 of the adapter to which an external connection can be made in the usual way, thus including the diode in series circuit with the internal lamp.

Figure 3 shows the diode 3 symbolically, that is to 15. say as the normal symbol indicating a diode and showing that the current flow is from right to left, i.e. from the lead 4 to the lead 5. If the diode were inserted in the opposite sense, which is very simply done, i.e. by leaving the lead 5 straight and bending the lead 4 to a 20. U-shape, the polarity is reversed and adapter units of either polarity can thus be produced very simply according to the requirement of the particular lamp with which it is to be used.

Since the adapter is an add-on feature it must be a 25. low cost item, this being achieved by the use of frictional pressure contacts to the two leads in place of the usual soldering or welding processes which are labour intensive and therefore expensive. In addition to making the electrical contacts in this way, the 30. shaping of the moulding 1 also locates the terminal blade 14 in position by a similar frictional contact

and thus considerably simplifies assembly.

Although described primarily in connection with multiplexing circuits in gaming machines, it will be understood that an adapter in accordance with the 5. invention is a self-contained unit which may be used in any circumstances where it is required to connect a diode in a series circuit with a small lamp holder or other illuminated component.

10.

15.

20.

25.

30.

C L A I M S

1. An adapter for a small, panel-mounting lamp holder or other illuminated component having a pair of male terminals, the adapter being in the form of a self contained unit provided with male and female terminal arrangements and including a diode of which one lead extends to the female terminal socket which is designed to accept one of the male terminals of the lamp holder or other component and the other lead of which is connected to the male terminal to provide a connection point to an external circuit.
2. An adapter unit according to claim 1 in which the connections to the diode leads are dry connections.
3. An adapter unit according to claim 2 having a body formed as a plastics moulding, in which one of the diode leads extends along the side of a recess in the body defining a socket for the reception of a male terminal of the lamp or other component and the other lead extends along the side of a passage within which the male terminal of the unit is a force fit.
4. An adapter unit according to claim 3 in which the male terminal and the passage within which it fits are formed with complementary inter-fitting portions which are brought into engagement when the terminal is forced into position.
5. An adapter unit according to claim 3 or claim 4 in which the diode lead extending into the recess defining the socket is bent into engagement with a shoulder extending transversely to the length of the recess.

6. The combination of an adapter unit according to any one of the preceding claims and a lamp holder or other illuminated component plugged into the socket of the unit.

5.

10.

15.

20.

25.

30.

111

Fig. 1.

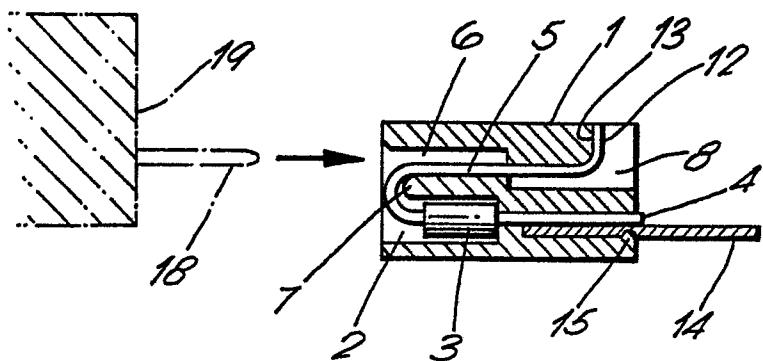


Fig. 2.

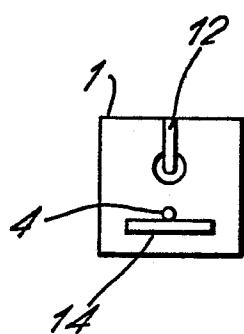


Fig. 3.

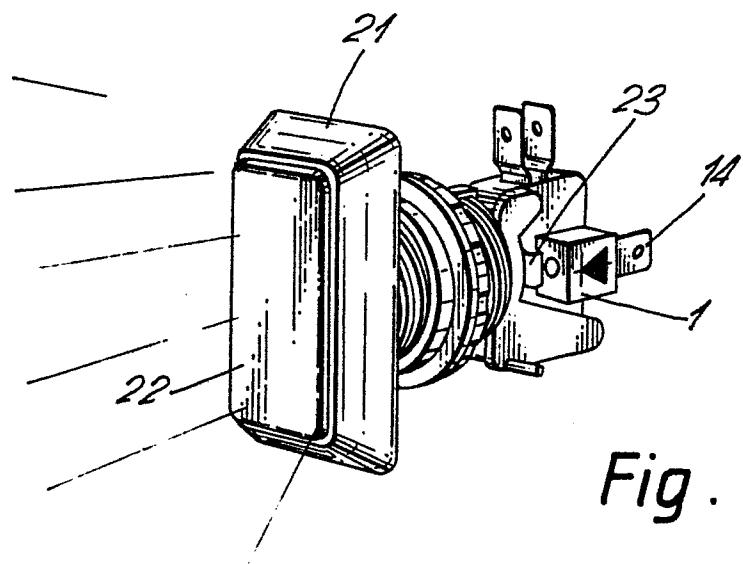
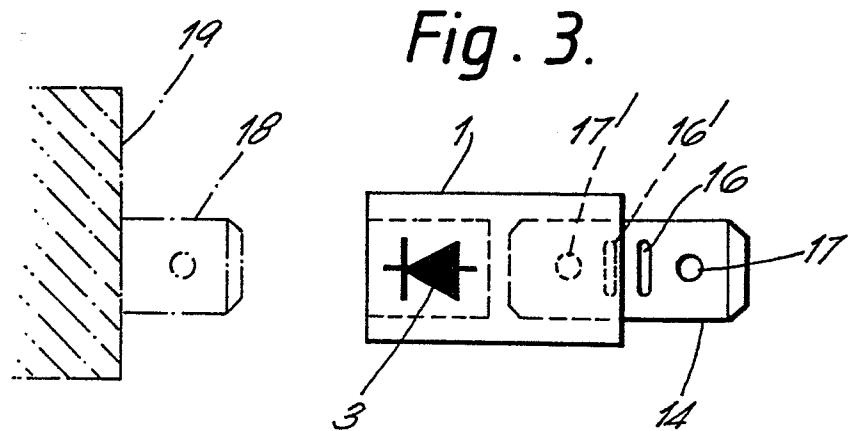


Fig. 4.