Oct. 9, 1962 G. E. MORRIS ETAL 3,058,090

ELECTRICAL SOCKET

Filed July 1, 1959

FIG.1

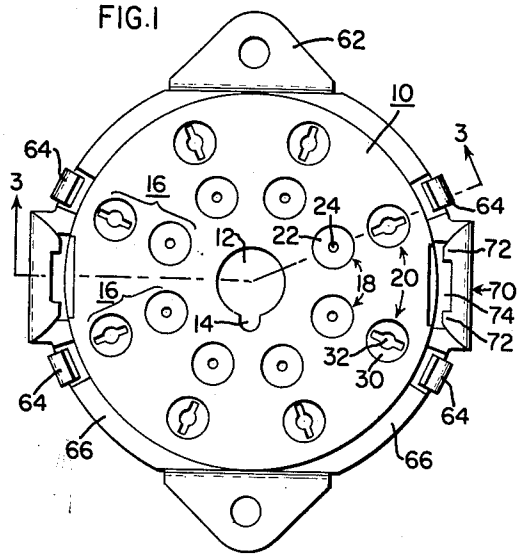


FIG.2

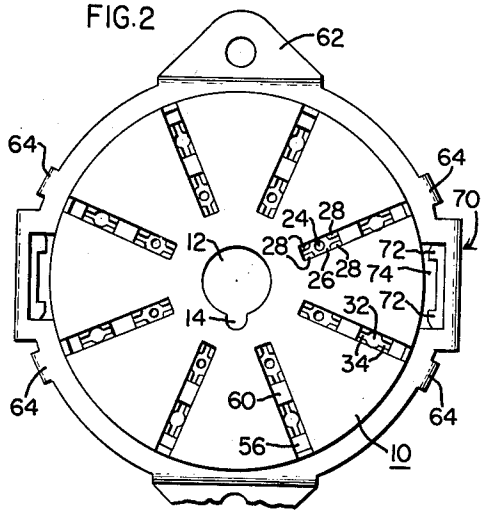


FIG.3

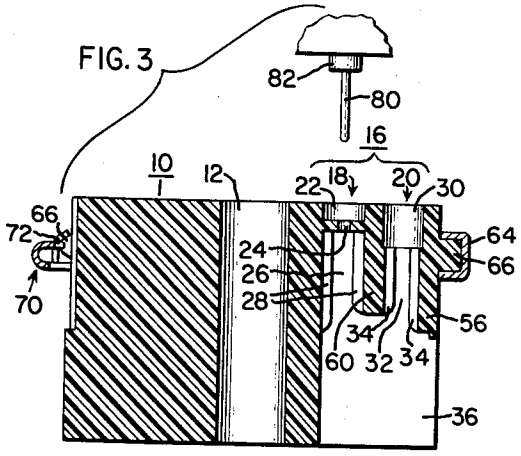


FIG.5

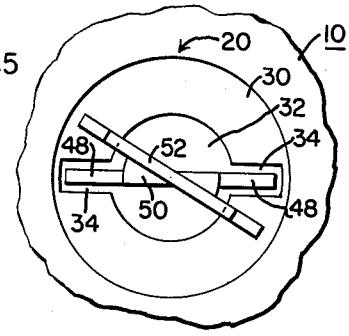


FIG.4

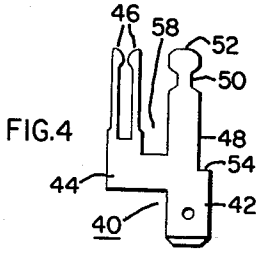
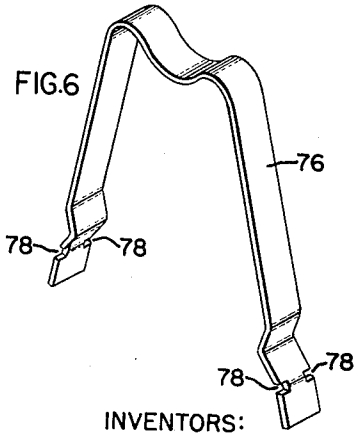


FIG.6



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3,058,090

ELECTRICAL SOCKET

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4 Claims. (Cl. 339—193)

The invention relates to electrical sockets, and particularly to such sockets which are adapted to receive electrical components having one or more pin-like terminals.

An object of the invention is to provide an improved electrical socket.

Another object of the invention is to provide an electrical socket having improved plug-in terminals which are formed as one piece and which are easily assembled into the socket base.

Another object of the invention is to provide an improved electrical socket having plug-in terminals which provide a good electrical connection between the pin-like terminals of an electrical component which is plugged into the socket and between other circuit elements.

Briefly, a socket in accordance with the invention comprises an insulating base portion having one or more sets of openings therein. Each set of openings includes a first opening, a second opening, and a slot connecting the first and second openings. A plug-in terminal in accordance with the invention fits into each set of openings, the terminal comprising a base portion, a contact portion extending from the base portion, and a retaining portion having a neck and a head extending from the base portion substantially parallel to the contact portion of the terminal. A plug-in terminal as just described is inserted into each set of openings so that the contact portion is in the first opening, so that the retaining portion is in the second opening, and so that the base portion is in the slot between the first and second openings. With the plug-in terminal in this position, the head of the retaining portion is twisted so that the terminal is retained in its set of openings.

The invention will be better understood from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the claims. In the drawing:

FIGURES 1 and 2 are plan views of a socket in accordance with the invention as viewed from above or from the top of the socket, and as viewed from below or from the bottom of the socket respectively;

FIGURE 3 is a cross sectional view of the socket in accordance with the invention taken along the lines 3—3 in FIGURE 1;

FIGURE 4 shows a plug-in terminal which is adapted to be used in the socket shown in FIGURES 1, 2, and 3;

FIGURE 5 is an enlarged view of a portion of the socket in accordance with the invention showing how the plug-in terminal is held in position; and

FIGURE 6 shows a perspective view of a spring clip which may be used in connection with the socket of the invention to hold a component firmly in the socket.

In the figures, like reference numerals refer to the same element or elements. In accordance with the invention, the socket comprises an insulating base **10** formed of some material such as mica filled phenolic. The socket shown in FIGURES 1, 2, and 3 is designed to accommodate or receive a conventional 8-pin electron discharge tube. However, a socket in accordance with the invention can be designed to accommodate other electrical components having pin-like terminals, such as a relay. The base **10** may comprise an inner opening **12** and a slot **14** for properly positioning or orienting the electrical component to be inserted in the socket. The insulating base **10** comprises a plurality of equally spaced

sets of openings **16**, each set of openings **16** being positioned along a radius of the insulating base **10** to conform with the configuration of the pin-like terminals of an 8-pin electron discharge tube. However, it is not essential that each set of openings **16** be positioned along a radius or be equally spaced, as long as the sets of openings **16** are arranged to conform with the configuration of the pin-like terminals of the component for which the socket is designed. Each set of openings **16** comprises a first opening **18** and a second opening **20**. Each of the first openings **18** of the sets of openings **16** includes an upper cylindrical opening **22** that is in the top or upper surface of the insulating base **10** and that extends downward for a distance followed by a smaller cylindrical opening **24** extending downward for a distance below the upper cylindrical opening **22**. A larger lower opening **26** extends below the smaller cylindrical opening **24**. Four guides **28** extend downward along the walls of the lower opening **26**. Each of the second openings **20** includes an upper cylindrical opening **30** that is in the top or upper surface of the base **10** and that extends downward for a distance followed by a smaller cylindrical opening **32** extending downward for a distance below the upper cylindrical opening **30**. Diametrical slots **34** are provided along the smaller cylindrical opening **32**. The first openings **18** of each set of openings **16** may be considered joined to the second openings **20** of the same set in the lower portion of the insulating base **10** by a connecting slot or general opening **36**.

FIGURE 4 shows a plug-in terminal **40** which is designed to fit into each set of openings **16**. The terminal **40** is formed from a flat, metallic plate of suitable material such as Phosphor bronze, this material providing good electrical conductivity and having a degree of resiliency. The terminal **40** comprises a base portion **42**, the base portion **42** providing means for connecting the terminal **40** to electrical circuit elements. The base portion **42** may be tapered or chamfered as shown to permit a terminal clip to be slipped over the base portion **42**. A contact portion **44** extends upward from the base portion **42** and includes two fingers **46**. The fingers **46** may be shaped substantially as shown and have sufficient resiliency so as to provide good electrical and mechanical contact with the pin-like terminal of the electrical component which is plugged into the socket. A retaining portion **48** also extends from the base portion **42** in substantially the same direction as the contact portion **44**. The retaining portion **48** includes a neck **50** and a head **52** having a shape similar to that shown in FIGURE 4. It is preferred, but not essential, that the neck **50** have a reduced width as shown. A shoulder **54** may be provided on the base portion **42** for retaining the terminal **40** in a manner which will be described hereinafter. The notch **58** provides the needed clearance when the terminal **40** is placed in the insulating base **10**. Since the terminal **40** is formed from a flat plate, its parts or portions lie substantially in a common plane as will be appreciated by an understanding of the drawing and the subsequent description.

As shown in the drawing, the terminal **40** is oriented with relation to the base **10**, shown in FIGURE 3 so that it can fit in the set of openings **16** shown in FIGURE 3. If the terminal **40** is visualized as being moved upwardly into the set of openings **16** shown in FIGURE 3, it will be seen that the base portion **42** will be located in the connecting slot or opening **36**, that the contact portion **44** will be located in the lower opening **26** and between the guides **28** of the first opening **18**, and that the retaining portion **48** will be located in the second opening **20** with the head **52** in the upper cylindrical opening **30** and with the neck in the smaller cylindrical opening **32**. With the terminal **40** in the position just described, the shoulder **54** of the terminal **40** comes to

rest at or is stopped by a web 56 of material that helps to form the connecting slot or opening 36. Likewise, the base of the notch 58 comes to rest at or is stopped by a web 60 of material between the first opening 18 and the second opening 20. Thus, the terminal 40 is prevented from being moved upward past a certain point with respect to the insulating base 10. Also, with the terminal 40 in the position just described, the head 52 of the retaining portion 48 of the terminal 40 is bent or twisted so that it does not line up with the diametrical slots 34 of the second opening 20. Thus, the head 52, after it is bent or twisted, prevents the terminal 40 from being moved or pulled downward with respect to the insulating base 10. FIGURE 5 shows a fragmentary plan view of a portion of the insulating base 10 with the terminal 40 in position in a set of openings 16. In FIGURE 5, it will be seen that the head 52 has been bent so that it is no longer aligned with the diametrical slots 34, thus preventing the terminal 40 from being pulled or moved downward.

The insulating base 10 may be suitably mounted or held on a chassis by means of a suitable mounting ring 62 which is slipped over the insulating base 10 from below until it is stopped by a flange or projection 66. A number of tabs 64 may be provided on the mounting ring 62 and bent around the flange or projection 66 to hold the mounting ring 62 to the insulating base 10. The mounting ring 62 may, if desired, include a pair of diametrically positioned locking members 70, these locking members 70 being a part of the mounting ring 62. The locking members 70 include an engaging bracket 72 which is curled or bent upward from the mounting ring 62 to form an opening 74. A spring clip 76, which is shown in the perspective view of FIGURE 6, may be passed over the component positioned in the socket, and serves to hold the component firmly. The spring clip 76 is bent or flexed at its ends and is provided with notches 78, also near its ends, so that when the ends of the spring clip 76 are passed downward through the opening 74 the notches 78 lock with the engaging brackets 72 and firmly hold the spring clip 76. The spring clip 76 is easily inserted into the locking member 70 and firmly holds a component in the socket.

As will be appreciated by a person skilled in the art, the fingers 46 of the terminal 40 provide a tight and secure mechanical and electrical connection between the terminal 40 and the pins or pin-like terminals of the electrical component which are to be plugged into the socket. One such pin-like terminal 80 is shown in FIGURE 3 above the first opening 18. In FIGURE 3, it will be seen that the pin-like terminal 80 may pass through the smaller cylindrical opening 24 so that it can engage the fingers 46 of the terminal 40. The pin-like terminal 80 may be provided with an enlarged shoulder 82 such as shown to provide a secure mechanical arrangement. The shoulder 82 of the pin-like terminal 80 fits into the upper cylindrical opening 22 of the first opening 18. The terminal 40 is easily stamped out and assembled into the insulating base 10. The terminal 40 is securely held within the base 10 by means of the head 52 on the retaining portion 48, by means of the shoulder 54 on the base portion 42, and by means of the base of the notch 58. As will also be appreciated by persons skilled in the art, it is easy to make electrical connections to the terminal 40 either at the base portion 42 from below the socket, or from the head 52 above the insulating base 10. However, in accordance with conventional practice, it is believed that most electrical connections will be made from beneath the socket by means of a spring terminal clip to be slipped over the base portion 42 of the terminal 40. Thus, a socket in accordance with the invention is easily made and assembled, and provides improved and good electrical terminals for connecting the socket into an electrical circuit.

While the invention has been described with reference

to a particular embodiment, it is to be understood that modifications may be made by persons skilled in the art without departing from the spirit of the invention or from the scope of the claims.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. A socket for an electrical component having at least one pin-like terminal, comprising an insulating base having at least one set of openings therein; each of said sets of openings including a first opening and a second opening which are connected by a general opening in a portion of said base; a plug-in terminal comprising a metallic plate including a base portion, a contact portion having two fingers extending from said base portion for receiving a pin-like terminal, and a retaining portion having a head extending from said base portion in the same direction as said contact portion, all said portions lying in a common plane; said plug-in terminal being positioned in said set of openings with said contact portion in said first opening, with said retaining portion in said second opening, and with said base portion in said general opening; and said head of said retaining portion of said terminal being adapted to be twisted to retain said plug-in terminal in said set of openings.

2. A socket for an electrical component having at least one pin-like terminal, comprising an insulating base having at least one set of openings therein; each of said sets of openings including a first opening and a second opening which are connected by a general opening in a portion of said base; a plug-in terminal comprising a metallic plate including a base portion, a contact portion for receiving a pin-like terminal, and a retaining portion having a neck and a head extending from said base portion in the same direction as said contact portion, all said portions lying in a common plane; said plug-in terminal being positioned in said set of openings with said contact portion in said first opening, with said retaining portion in said second opening, and with said base portion in said general opening; and said head of said retaining portion of said plug-in terminal being twisted in said second opening to retain said plug-in terminal in said set of openings.

3. A socket for an electrical component having a plurality of spaced pin-like terminals, comprising an insulating base having upper and lower portions and a plurality of sets of openings positioned to conform with the position of said pin-like terminals; each of said sets of openings including a first opening in said upper portion, a second opening having a constriction in said upper portion, and a slot in said lower portion connecting said first and said second openings; a plurality of plug-in terminals each comprising a metallic plate including a base portion, a contact portion for receiving a pin-like terminal, and a retaining portion having a neck and a head extending from said base portion substantially parallel to said contact portion, all said portions lying in a common plane; one of said plug-in terminals being positioned in each of said sets of openings; each of said plug-in terminals being inserted in said lower portion of said insulating base so that said contact portion of said plug-in terminal is in said first opening, so that said retaining portion of said plug-in terminal is in said second opening with said neck in said constriction, and so that said base portion of said plug-in terminal is in said slot and is stopped by a portion of said insulating base; and said head of said retaining portion of each of said plug-in terminals being twisted to retain said plug-in terminal in its respective set of openings.

4. A socket for an electrical component having a plurality of spaced pin-like terminals, comprising an insulating base having upper and lower portions and a plurality of sets of openings positioned to conform with the position of said pin-like terminals; each of said sets of openings including a first opening in said upper portion, a second opening in said upper portion, and a general opening in said lower portion connecting said first and second

openings, said second opening having an upper zone and a smaller lower zone, said lower zone having a diametrical slot; a plurality of plug-in terminals each comprising a metalic plate including a base portion having a shoulder, a contact portion having two fingers extending from said base portion for receiving a pin-like terminal, and a retaining portion having a neck and a head extending from said base portion substantially parallel to said contact portion, all said portions lying in a common plane; one of said plug-in terminals being positioned in each of said sets of openings; each of said plug-in terminals being inserted in said lower portion of said insulating base so that said contact portion of said plug-in terminal is in said first opening so that said retaining portion of said plug-in terminal is in said second opening with said head in said upper zone and with said neck in said lower zone, and so that said base portion of said plug-in terminal is in said general opening with said shoulder being stopped by a portion of said insulating base; and said head of said

retaining portion of each of said plug-in terminals being twisted out of alignment with said diametrical slot to retain said plug-in terminal in its respective set of openings.

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