Feb. 15, 1949. R. R. ROUP 2,461,658

ELECTRIC CIRCUIT UNIT

Filed April 19, 1946

Fig. 1.

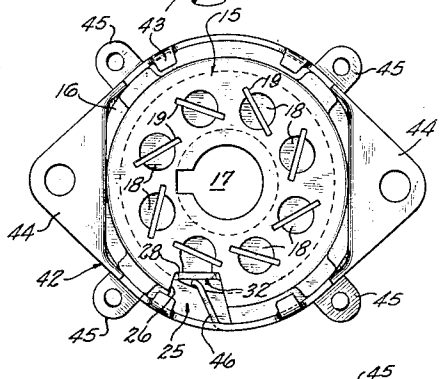


Fig. 2.

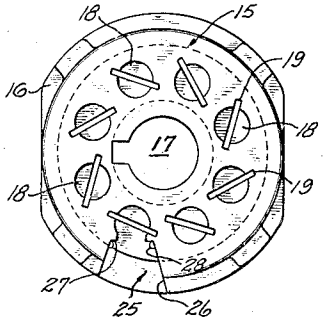


Fig. 5.

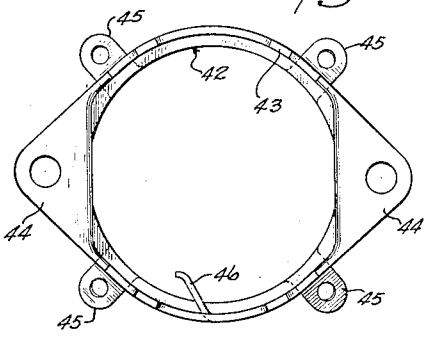
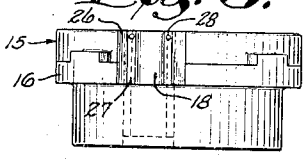


Fig. 3.



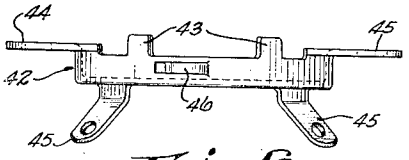


Fig. 6.

Fig. 7.

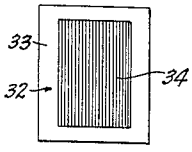


Fig. 8.

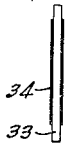
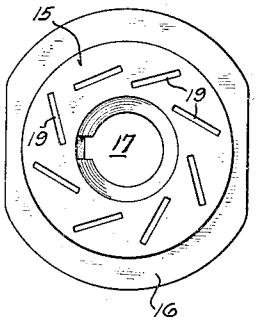


Fig. 4.



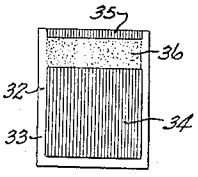


Fig. 9.

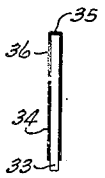


Fig. 10.

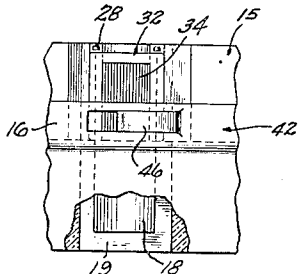


Fig. 11.

INVENTOR.
ROLLAND R. ROUP

BY John W. Michael

ATTORNEY.

Patented Feb. 15, 1949

2,461,658

UNITED STATES PATENT OFFICE

2,461,658

ELECTRIC CIRCUIT UNIT

Rolland R. Roup, Milwaukee, Wis., assignor to Globe-Union Inc., Milwaukee, Wis., a corporation of Delaware

Application April 19, 1946, Serial No. 663,373

7 Claims. (Cl. 250—16)

1

This invention relates to improvements in unitary sub-assemblies for electrical devices and particularly to an electronic tube socket having combined therewith an electric circuit component providing one or more electric circuit elements to be employed with the electronic tube to be mounted in the socket.

It is accordingly one object of the present invention to provide a sub-assembly or unit device including in one structure a plurality of the elements heretofore employed as separate units in an electrical device.

Another object of the invention is to provide an electronic circuit sub-assembly or unit including an electronic tube socket and an electric circuit component bearing one or more of the circuit elements to be directly associated with the tube in the circuit.

A further object of the invention is to provide an electronic tube socket in which a component providing one or more of electrical circuit elements may be so placed as to cooperate with the tube prongs in forming a portion of an electric circuit.

Another object of the invention is to provide an electronic tube socket combined with an electric circuit component providing capacitance, resistance, reactance or any combinations thereof in such manner that placing the tube in the socket and making the usual connections with the socket also connects the circuit elements in the circuit.

And a further object of the invention is to provide a simple and easily manufactured electronic tube socket combined with other electronic circuit elements combined into a single circuit component and which may be readily varied as desired during manufacture but which are permanently retained in the assembled or combined condition during use.

Objects and advantages other than those above set forth will be apparent from the following description when read in connection with the accompanying drawings, in which:

Fig. 1 is a top plan view of an electronic tube socket combined with an electric circuit component comprising one or more electric circuit elements;

Fig. 2 is a top plan view of the insulating material portion of an electronic tube socket showing the formation thereof to receive an electronic circuit component;

Fig. 3 is a side elevation of the structure shown in Fig. 2;

Fig. 4 is a bottom plan view of Fig. 2;

Fig. 5 is a top plan view of means applied to the

2

socket insulator and serving both as a socket holder and to aid in retaining an electrical circuit component in the socket structure;

Fig. 6 is a side elevation of the structure shown in Fig. 5;

Fig. 7 is a side elevation of an electric circuit component providing a capacitor to be combined with the tube socket;

Fig. 8 is an edge view of Fig. 7;

Fig. 9 is a side elevation of an electric circuit component including a capacitor and a resistor as the circuit elements to be combined with the tube socket;

Fig. 10 is an edge elevation of Fig. 9; and

Fig. 11 is a partial elevational view of the present combined structure and is partially in section to show the lower portion of one of several apertures in the tube socket for receiving a tube prong clip and terminal.

Generally, the combined structure provides an electronic tube socket having an insulating material portion formed with a plurality of tube prong apertures therethrough receiving prong clips and having terminals therefrom and with a conductive material ring about the insulating socket portion to serve as a holder for the socket. A notch is formed in the insulating socket portion in one or more locations to provide a cavity receiving an electric circuit component to which contact is to be made from a prong of a tube inserted in the socket or from the prong clip within the socket and to which contact may also be made by the mounting ring exteriorly of the socket insulating portion or by another exterior conductive connection. The electric circuit component is so shaped as to be received in the notch and retained therein permanently merely as a result of assembly of the combined structure. The electric circuit component may provide the electric circuit elements of capacitance, resistance, or reactance, or any combination thereof and such elements may be connected in any desired manner.

Referring particularly to the drawings, an insulating material socket portion 15, preferably of ceramic material such as steatite is shaped substantially as a cylinder with partial exterior flanges 16 approximately midway of the axial length of the cylinder. The cylinder 15 is formed with a central and substantially conical aperture 17 and with a series of apertures 18 arranged about aperture 17 and extending from one end of the cylinder substantially therethrough. Grooves in the wall of apertures 18 continue as rectangular apertures 19 extending through the bottom of the

apertures 18 so that apertures 18, 19 are adapted to receive a well known type of tube prong clip with a terminal lug to extend outwardly from the cylinder as is well known.

One or more notches generally designated 25 are formed in the cylinder insulating socket portion 15 and are severally adjacent the prong clip apertures. Each of such notches extends from a side surface of the insulator into one of the apertures 18, to provide access to the notch from within such aperture and through the notch itself. The notch is generally V-shaped with the notch side 26 provided with ledges 27 so placed that a circuit component (to be described hereinafter) may rest against the ledges with a portion of the surface of the component forming a chord of the circular wall of the aperture 18. In the axial dimension of the socket the notch extends only for a portion of the depth of aperture 18 to provide a floor on which the circuit component rests. Adjacent the open end of the notch, the notch side walls 26 are severally formed with projections 28 so placed as to extend over the circuit component and prevent axial movement thereof from the notch when the entire combination is completed. It will be apparent that the notch need not be open-ended as shown but may take the form of a V-shaped aperture or other forms, thus eliminating the need for the projections 28.

The electric circuit component is formed as a plate-like member generally designated 32, to be inserted in the notch as shown in Figs. 1 and 11 and is formed as shown in Figs. 7, 8 or 9, 10. The electrical circuit component comprises a plate 33 of high quality insulating or dielectric material and is preferably a ceramic such as steatite, of such size as to fit closely in the notch when resting on the notch ledges 27 and to fit closely beneath the notch side wall projections 28. Such plate has formed thereon, as by coating, one or more electrical circuit elements, the elements designated 34 and 35 being a conductive material (indicated in the drawing by close vertical lines) to form the conductive plates of a capacitor separated by the dielectric 33. The dielectric may also be provided with one or more resistance strips 36 (indicated in the drawing by stippling) also preferably formed as a coating on the surface of the insulating or dielectric member 33 and connecting the two capacitor plates 34, 35, as shown in Figs. 9 and 10. When the circuit component is placed in the notch as above described, it will be apparent that one of the capacitor plates 34 or 35 will contact with the prong clip in the aperture 18 or directly with a prong which may be made resilient as by splitting and spreading the ends of the prong. When the combined capacitor-resistor component, as shown in Figs. 9 and 10, is used, the capacitance and resistance are in parallel but obviously may be arranged in series if desired. It will be understood that the conductive coating may also take the form of a reactance coil and that various combinations of electric circuit elements as above described may be formed on the same dielectric and inter-connected in any manner desired.

A mounting member generally designated 42 is formed as a flanged metallic ring encircling and providing a seat for the insulating socket portion flange 16 and is provided with tabs 43 to be bent over to fix the ring on the flange 16. The ring may also be formed with or without lugs 44 and ears 45 which may serve either for mounting the combination structure or as circuit element terminals or for both purposes. A finger 46 is struck from that portion of the ring which will be opposite the notch 25 in the completed structure and such finger is adapted to be bent into the notch into contact with one of the circuit elements of the circuit component 32. It will be understood that the several circuit elements may be arranged as required by the circuit and that the finger 46 is then brought into contact with either of the circuit elements as required to complete the circuit. It is preferred that the finger 46 be resilient but in any case the finger is of sufficient size and presses on one electric circuit element with sufficient force to keep the circuit component 32 under the projections 28 and to provide electrical contact. It will also be understood that the circuit component may be retained in its seated position by other means such as an insulating block fitting in the notch beneath the ring and that connections may be made to the circuit elements through the notch by other means than the finger 46 shown.

Although but one embodiment of the present invention has been illustrated and designated herein, it will be apparent to those skilled in the art that various changes and modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. In a unitary sub-assembly for electrical devices, a tube socket having a circular aperture therethrough and a notch communicating with the aperture and extending from one end of the socket and an electric circuit component mounted in the notch, the notch side walls being formed with ledges supporting the component on a chord of the aperture side wall and being formed with projections adjacent the end of the socket for engagement with the component to prevent movement thereof from the notch in one direction.

2. In a unit for electrical devices, a tube socket having an aperture therethrough adapted to receive a tube prong, a notch in the periphery of said socket communicating with said aperture, an electric circuit component mounted in said notch adjacent said aperture to contact said tube prong, and means retaining said component in its mounted position and providing electrical contact with said component.

3. In a unit for electrical devices, a tube socket having an aperture therethrough adapted to receive a tube prong, a notch in said socket extending from the periphery thereof to said aperture, an electric circuit component mounted within said notch adjacent said aperture to contact said tube prong, and means retaining said component in its mounted position.

4. In a unit for electrical devices, a tube socket having an aperture therethrough adapted to receive a tube prong, a notch in the periphery of said socket communicating with said aperture, said notch being of smaller cross-section adjacent said aperture, an electric circuit component in said notch adjacent said aperture to contact said tube prong, and means holding said component in said notch against the reduced cross-section portion thereof.

5. In a unit for electrical devices, a tube socket having an aperture therethrough adapted to receive a tube prong, a notch in the periphery of said socket communicating with said aperture, and an electric circuit component in said notch adjacent said aperture in a prong contacting position, means cooperating with said notch for preventing movement of said component into said

aperture beyond the prong contacting position, and means retaining said component against said cooperating means.

6. In a unit for electrical devices, a tube socket having an aperture therethrough adapted to receive a tube prong, a notch in the periphery of said socket communicating with said aperture, an electric circuit component mounted in said notch adjacent said aperture to contact said tube prong, and a metallic ring fixed on said socket and having a finger extending into said notch and bearing against said component to retain said component in said notch and in contact with said prong.

7. In a unit for electrical devices, a tube socket having an aperture therethrough adapted to receive a tube prong, a notch in the periphery of said socket communicating with said aperture,

and a plurality of interconnected electric circuit elements in said notch with one of the elements contacting said prong, and means for maintaining said contact and retaining said elements in said notch.

ROLLAND R. ROUP.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,703,651	Alden	Feb. 26, 1929
1,825,534	Mavrogenis	Sept. 29, 1931
1,973,248	Evans	Sept. 11, 1934