

Oct. 21, 1930.

M. B. GROUT

1,778,896

TERMINAL CAP

Filed June 27, 1927

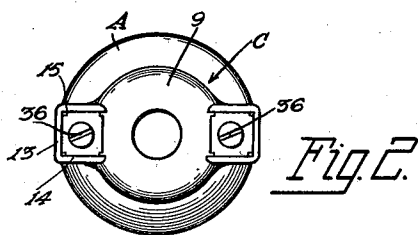


Fig. 2.

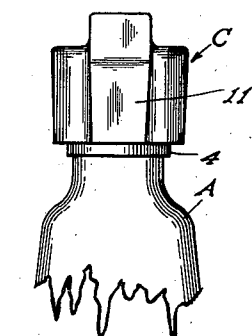


Fig. 3.

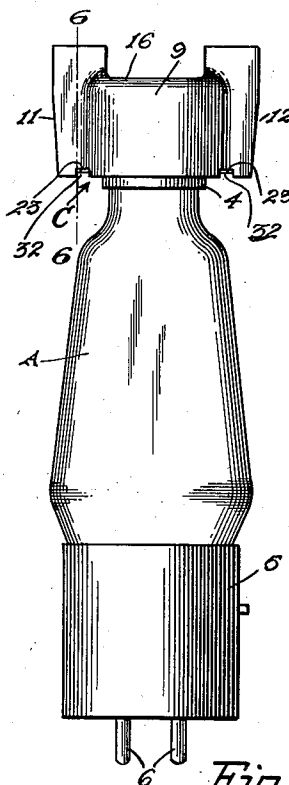


Fig. 1.

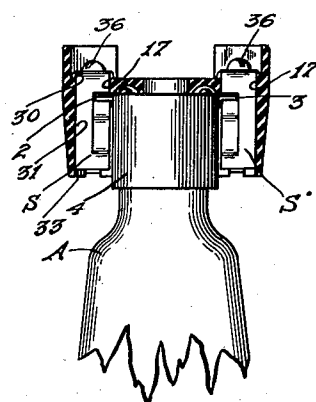


Fig. 5.

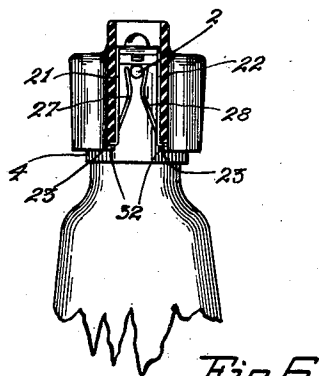


Fig. 6.

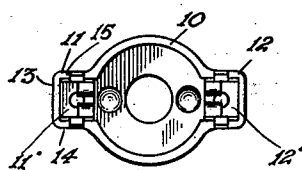


Fig. 4.

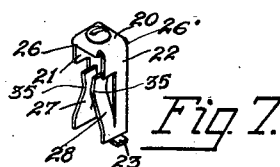


Fig. 7.

Inventor:
Martin B. Grout.
By A. A. Ganshousen,
Attorney.

UNITED STATES PATENT OFFICE

MARTIN B. GROUT, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

TERMINAL CAP

Application filed June 27, 1927. Serial No. 201,593.

My invention has to do with terminal connectors, and more particularly to terminals suitably secured to a supporting means or cap to which electrical conductors may be conveniently attached, and which cap may be detachably connected to terminals of the heater element of a thermionic tube of the alternating current type.

A thermionic tube of a well known alternating current type comprises in general a glass envelope provided with a stem in each extremity. The upper stem permits the egress of the filament or heater leads which are in turn connected to a pair of studs carried in an insulating base or cap secured to the upper extremity of the glass envelope. These studs provide means for connecting a suitable low voltage alternating current source to the heater element to cause the same to energize for purposes well understood. An object of my invention is to provide a suitable terminal or connector cap provided with terminal means for engaging the terminal studs of the tube to carry the current from an alternating current source to the heater element.

A feature of my invention is the provision of a terminal cap supporting a pair of spring terminal clips which permit the terminal cap to be readily detachably secured to the tube, the said terminal clips providing simple and efficient means for securing contact with the studs of the tube, and at the same time serving as means for holding the cap in position against displacement.

Another feature of my invention is the provision of a pair of spring terminal clips supported in the terminal cap or connector and the novel means in the form of spring members integral with the terminal clips for securing the same in the terminal cap against displacement.

A further feature of my invention is the provision of means for protecting the terminal screws of the terminal cap to which the bus wires are connected.

The above features as well as others will be fully described in the ensuing specification and in the appended claims.

For a more complete understanding of my

invention, reference may be had to the accompanying drawing in which like reference characters in the several views denote like parts and in which,

Fig. 1 illustrates a thermionic tube of the alternating type in elevation with the terminal cap of my invention positioned thereon.

Fig. 2 is a plan view of Fig. 1.

Fig. 3 is a left side elevation of Fig. 1 showing only the upper portion of the tube.

Fig. 4 is a bottom view of the terminal cap of my invention.

Fig. 5 is a view similar to Fig. 1 but showing the terminal cap in section to clearly illustrate its position on the cap of the thermionic tube.

Fig. 6 is a sectional view along the line 6-6 of Fig. 1 and clearly illustrates how the spring terminal clip is supported in the terminal cap, and the spring means integral with the terminal clip for engaging a terminal stud connected to the heater element of the thermionic tube, and

Fig. 7 is a perspective view of one of the terminal clips supported in the terminal cap of my invention.

Referring now more in detail to my invention as illustrated in the accompanying drawing, a thermionic tube of the alternating current type with which the terminal cap of my invention is associated, in general comprises a glass envelope A provided with a stem in each extremity. The upper stem permits egress of the heater or filament leads which are connected to studs 2 and 3 secured to an insulating cap 4 which is secured to the upper extremity of the glass envelope A by cementing the same thereto. The lower extremity of the glass envelope has cemented thereto an insulating base 5 which carries the studs 6 to which the other elements of the thermionic tube are connected for purposes as are well understood.

The studs 2 and 3 to which the heater element leads of the tubes are connected and which are carried in the cap 4, provide means for connecting the heater element of the tube to an alternating source of current of suitable voltage to heat the same.

The terminal cap or connector C of my in-

vention comprises an inverted cup shaped portion 9 of suitable molded insulating material and is of a size to permit the same to fit over the cap 4 secured to the upper extremity of the glass envelope A of the tube. Diametrically opposite portions of the wall 10 of the cup portion 9 are provided with integrally formed laterally extended portions 11 and 12 forming square pockets 11' and 12'. The walls 13, 14 and 15 which form the extended portions 11 and 12, extend upward from the base 16 of the cup portion 9, and square openings 17 extending through the base 16 of the inverted cup portion 9 are adapted to permit the entry of the spring terminal clips S and S' within the square pockets 11' and 12' formed by the laterally extended portions 11 and 12. The said spring terminals are adapted to make contact with the terminal studs 2 and 3 in the cap 4 when the terminal cap C is positioned on the said cap 4 of the tube.

The spring terminal clip S of the present embodiment of the invention which is typical of both is formed of a blank of suitable sheet metal and comprises a substantially square base 20 having a pair of integrally formed members 21 and 22 depending from opposite sides thereof, and each extremity of the members 21 and 22 is provided with a tab 23 bent at right angles to the members 21 and 22. The other two opposite sides of the base 20 are provided with depending tabs 26 and 26' at right angles to the said base 20. A portion of the metal of each of the depending members 21 and 22 is shaped by means of a shearing and forming operation into a pair of converging spring arms 27 and 28 the free ends of which in turn extend slightly outward.

To insert a spring terminal clip S as above described into the pocket 11' formed by the laterally extended portion 11 of the terminal cap C the free ends of the depending members 21 and 22 which diverge slightly are flexed until the free ends of the same may be inserted between the projecting walls 14 and 15 above the base 16 of the cup portion 9. The spring terminal S when thus positioned may now be forced down through the square orifice 17 until the tabs 26 and 26' engage respectively the offset portion 30 in the inner face 31 of the wall 13 of the extended portion 11, and the face 16 of the base of the cup portion 9 adjacent to the edge of the orifice 17. At the same time the angular tabs 23 on the extremities of the depending members 21 and 22 are in alignment with notches 32 in the bottom edges 33 in the walls 14 and 15 of the portion 11 and the tension of the depending members 21 and 22 under which they were placed due to the flexure of the same as before described now forces the tabs 23 into the aligned notches 32. The tabs 26 and 26' engaging respectively the offset 30 and the face 16 in proximity to the edge of the orifice 17, and the tabs 23 en-

gaging the notches 32 prevent longitudinal movement in the U shaped laterally extended portion 11 and position the spring terminal S in the terminal cap C against displacement. A terminal clip S' is also positioned in the U shaped laterally extended portion 12 of the terminal cap C in a similar manner.

To position the terminal cap or connector C on the cap 4 of the tube with its spring terminals S and S' in engagement with the respective terminal studs 2 and 3, the inverted cup shaped portion 9 of the cap C is placed over the cap 4 with the terminal studs 2 and 3 carried thereby extending into the U shaped extended portions 11 and 12. As the cap C is moved down the spring arms 27 and 28 of the respective spring terminals S and S' are engaged by the respective studs 2 and 3 forcing them apart against their normal tension. The continued downward movement of the terminal cap C causes the studs 2 and 3 to pass the "humps" 35 in the respective spring arms 27 and 28 of the terminals S and S' producing a snap action and the free ends of the arms 27 and 28 now engage the terminal studs 2 and 3 as clearly illustrated in Fig. 6. The cap C is held in a fixed position against displacement on the cap 4 of the tube by the action of the spring arms 27 and 28, but at the same time may be readily removed as is apparent from the above description. The bases 20 of the spring terminals S and S' are provided with tapped orifices which are adapted to receive screws 36 by means of which the conductors from an alternating current source may be secured.

The bus wires connected to the spring clips S and S' by means of the screws 36 are generally insulated except at the point where the wire connects to the spring clips. So as to protect the base portions of the wire where they connect to the spring clips, and the spring clips themselves from being short circuited or contacting with foreign articles, the walls 13, 14 and 15 extend considerably beyond the plane of the terminal screws 36.

From the foregoing it will be noted that I have provided a terminal connector which is provided with terminal clips that hold themselves in position by their spring action and which yielding contact with the terminal studs of the tube cap by means of their spring action.

While I have shown a specific form of connector, it is obvious that my invention is susceptible of various changes and modifications without departing from the spirit and scope thereof. Therefore I desire to cover all such modifications and changes as come within the spirit and scope of the appended claims.

Having described my invention what I claim as new and desire to secure by United States Letters Patent is:

1. A device of the character described in-

cluding an inverted cap member having a pair of laterally projecting members and a hollow cylindrical central portion, terminal contact spring members within said cap member, means in said cap member and means integral with said spring members engaging said means in said cap member for retaining said spring members in position.

2. A device of the character described including an inverted cap member, laterally projecting members integral with said cap member, terminal contact spring members within said projecting members, and means integral with said spring members for retaining said spring members in said projecting members.

3. A device of the character described including an inverted cap member, laterally projecting members integral with said cap member forming pockets, terminal contact spring members within said pockets, and means integral with said spring members for retaining said spring members in said pockets.

4. A terminal cap of the character described including electrical contact spring devices, laterally projecting members integral with said cap forming pockets for receiving said spring devices, and depending members for said spring devices provided with angularly extending tabs for engaging means in said cap member for retaining said spring devices in place.

5. A terminal cap of the character described including terminal contact spring devices, laterally projecting members integral with said cap forming pockets for receiving said spring devices, depending members of said spring devices having portions shaped to form spring arms to electrically engage terminal means, and means integral with said depending members for retaining said spring devices in said pockets.

6. A terminal cap of the character described including contact spring devices, laterally projecting members integral with said cap forming pockets for receiving said spring devices, depending members of said spring devices having portions shaped to form spring arms to engage terminal contacts, notches in the rim of said terminal cap, and angular tabs on said depending members adapted to engage said notches to retain said spring devices in said pockets.

7. A connector device including a terminal cap formed of insulating material having a pair of integrally formed laterally extending members and an intermediate hollow cylindrical portion, electrical contact means adapted to be supported by said members, said contact means including spring means integral therewith for holding the same in position relative to said insulating member, and spring means for yieldingly contacting with contact connectors.

8. A connector device including a terminal cap having a hollow cylindrical portion and laterally protecting members formed of insulating material, electrical contact means adapted to be supported by said projecting insulating members, spring means integral with said contact means for holding the same in position relative to said insulating member, spring means integral with said contact means for yieldingly contacting with contact connectors, connecting means for securing conductors to said contact means, and means formed integral with said projecting insulating member for protecting said connecting means.

9. A connector of the character described including an insulating member having a socket for receiving a member supporting electrical connectors, said insulating member having laterally projecting portions, spring contact means for said laterally projecting portions of insulating member and means integral with said spring contact means cooperating with means in said member adapted to secure said contact means to said insulating member by spring tension and adapted to make contact with the electrical connectors of said cap by spring tension.

10. A connector cap having a cylindrically shaped member of insulating material provided with integrally formed extensions supporting spring contact members, spring means integral with said contact members and cooperating with means in said extensions to maintain said contact members in said extension, and a member adapted to fit into said cylindrical member, and outwardly extending contact members for said member adapted to engage said spring contact members of said insulating member.

11. A connector cap having a cylindrically shaped member of insulating material provided with integrally formed extensions supporting spring contact members, spring means integral with said contact members and cooperating with means in said extensions to maintain said contact members in said extensions, and a member adapted to fit into said cylindrical member, and outwardly extending contact members for said member adapted to engage said spring contact members of said insulating member, connecting means for securing conductors to said spring contact members, said connecting means being located within said integrally formed extensions of said cylindrical member to protect said connecting means.

12. A connector terminal comprising a spring terminal and an insulating member having a laterally projecting integrally formed extension adapted to receive said spring terminal, integrally formed means for said spring terminal for contacting with means in said insulating member to prevent

movement of said spring member relative to said insulating member.

13. A device of the character described including a cap member having integrally formed laterally extended portions provided with orifices, and self positioning spring contact members fitting into said recesses.

14. A device of the character described including a cap member having integrally formed laterally extended portions provided with orifices, and self maintaining spring contact members fitting into said recesses.

Signed by me, at Chicago, county of Cook and State of Illinois, this 24th day of June, 1927.

MARTIN B. GROUT.

20

25

30

35

40

45

50

55

60

65