Oct. 29, 1929. A. F. F. GILSON 1,733,591

ELECTRIC CIRCUIT CONNECTER

Filed April 29, 1926

Fig. 1.

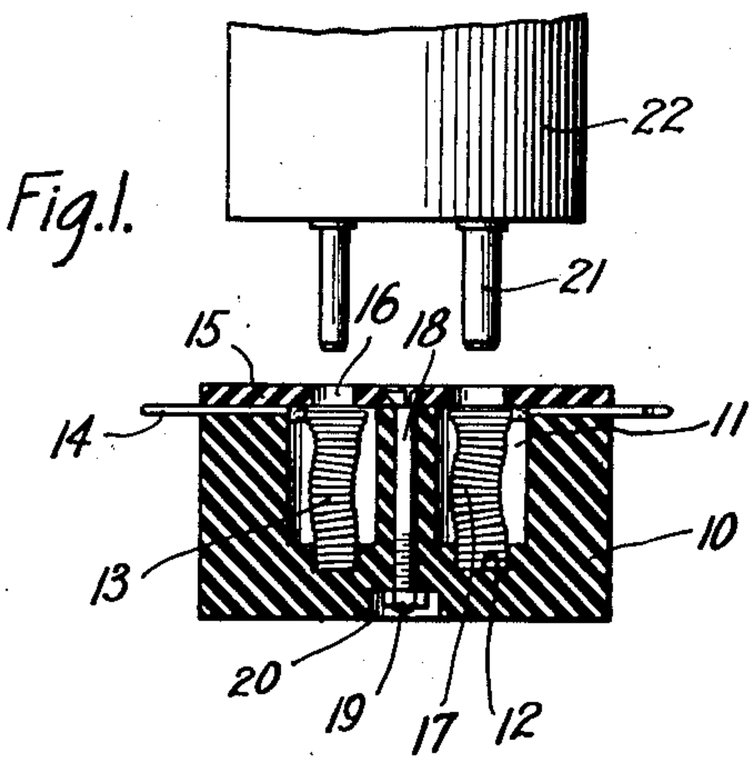


Fig. 2.

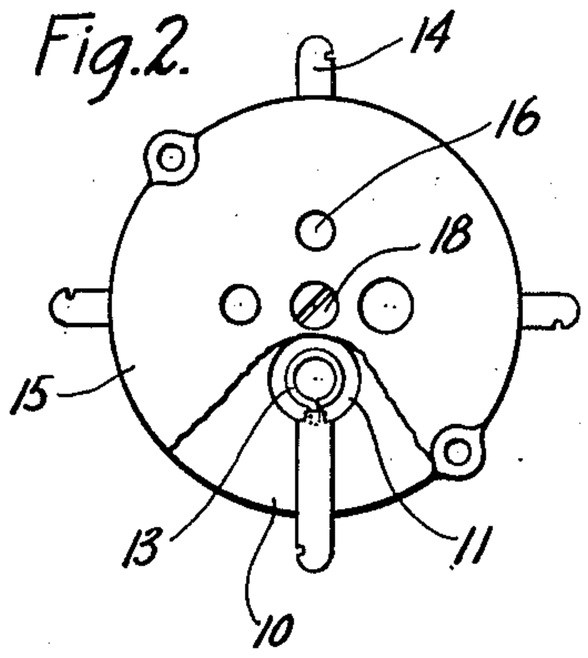


Fig. 3.

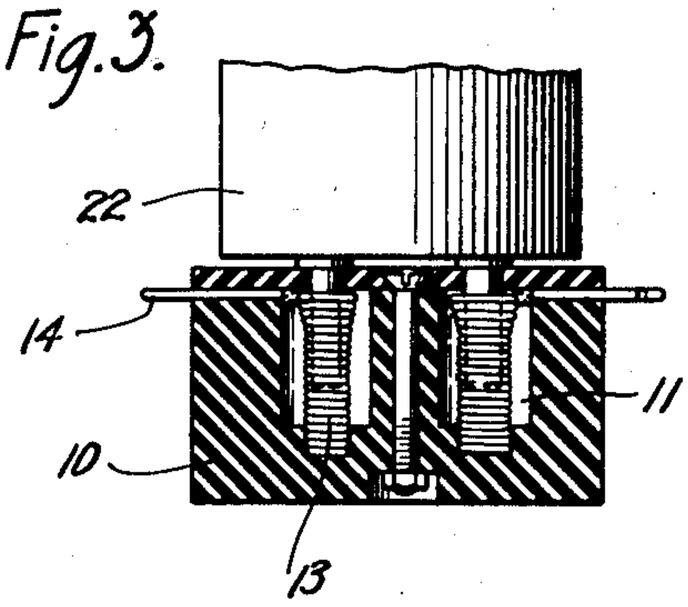


Fig. 4.

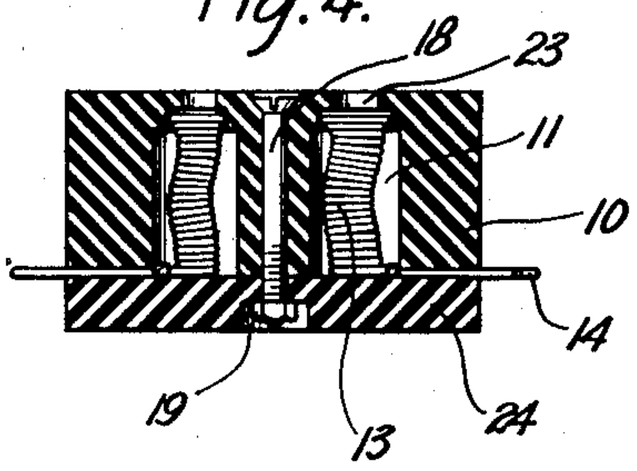
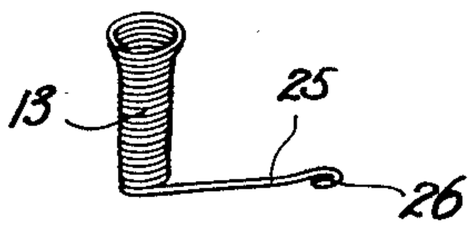


Fig. 5



Inventor:
Albert F. F. Gilson
by Joel C. A. Palmer Att'y.

Patented Oct. 29, 1929 1,733,591

UNITED STATES PATENT OFFICE

ALBERT F. F. GILSON, OF ORADELL, NEW JERSEY, ASSIGNOR TO BELL TELEPHONE LABORATORIES, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

ELECTRIC-CIRCUIT CONNECTER

Application filed April 29, 1926. Serial No. 105,389.

This invention relates to circuit connecters of the plug and socket type and more particularly to receptacles or sockets for plugs of vacuum tube bases.

Heretofore, sockets for push type vacuum tubes consisted in general of a disc or block having apertures to receive the terminal pins of a vacuum tube base, and a plurality of bent leaf springs within the socket to engage the longitudinal surface of the terminal pins to hold the vacuum tube in the socket and provide electrical connections for the electrodes. The disadvantages of this construction are the difficulty of maintaining the proper resiliency of the leaf springs to insure positive contact with the terminal pins, and the limited contact secured with a flat surface spring. Furthermore, the limited contact between terminal pin and spring requires accurate dimensions of these elements to secure satisfactory operation.

An object of this invention is to overcome these disadvantages by an electrical connection in which substantially the whole surface of the terminal pin on the vacuum tube base is in engagement with the contact.

A further object of the invention is to provide an arrangement of the contacts whereby the necessity of accurate dimensioning of the elements is overcome.

In accordance with this invention, an insulating block or socket is provided with a plurality of chambers or pockets arranged about the axis of the socket. These chambers are provided with recesses therein to receive closely wound wire helical contacts having one end of larger dimension than the other, and a terminal at one end projecting through the side of the socket. These contacts are normally slightly longer than the chambers in which they are seated, so that an insulating member having apertures corresponding with the helical contacts, but of smaller diameter, may be fastened to one end of the socket to compress the contacts and misaline the intermediate turns of the helices.

This arrangement provides a compact socket for push type vacuum tubes, in which the terminal pins on the vacuum tube base may be inserted in the helical contacts to realine the turns of the helices and provide a large surface frictional contact. Furthermore, by such an arrangement the vacuum tube is held securely in the socket since the turns of each helix tend to wind around the terminal pins.

A feature of the invention is the misalinement of the intermediate portion of the helical contact to insure a positive engagement of a large portion of the contact with the terminal pin of the vacuum tube base.

Another feature is the cooperating action of the guiding portion of the helical contact with the misalined turns hereof, to prevent irregular positioned terminal pins distorting the contacts.

These and other features of the invention will be apparent from the following detailed description in connection with the accompanying drawing, in which Fig. 1 illustrates in cross section, a push type socket made in accordance with this invention; Fig. 2, is a plan view of Fig. 1 with a portion broken away to show the relative position of one of the contacts; Fig. 3 is the same as Fig. 1 with the vacuum tube inserted in the socket; Fig. 4 is a modified form of the socket shown in Fig. 1; and Fig. 5 is an enlarged view of a modified contact made in accordance with this invention.

Referring particularly to Fig. 1, the push type socket of this invention, comprises a block or receptacle 10, preferably of molded insulating material, such as hard rubber or bakelite, which is provided with cylindrical internal chambers 11. The chambers 11, which are usually four in number, are arranged at four corners of a square around the axis of the receptacle 10, and are provided at the lower end with a recess 12, of smaller diameter. Arranged within each chamber is a closely wound wire helical contact 13, having the lower end turns of substantially the same diameter as the recess 12, to provide a force fit connection between the contact 13 and the receptacle 10. These contacts are normally longer than the length of the chamber 11 and the recess 12, so that before assembly they project beyond the upper surface of the receptacle 10. The upper end of each contact

is provided with an outwardly tapered portion to provide guiding means for irregular spaced terminal pins of a vacuum tube base. Attached to the end turn of the tapered portion of the contact 13 is a metallic terminal 14 which projects through the side of the receptacle 10 at right angles to the axis of the contact 13 and is preferably seated in a groove in the upper surface of the receptacle 10. A disc 15 having apertures 16, of slightly smaller diameter than the tapered portions of the contacts 13, is arranged to close the open end of the receptacle 10 with the apertures 16 coaxial with the ends of the contacts 13. This disc compresses the helical contacts 13 within the chambers 11 due to the difference between the length of the chamber 11 and the helical contact 13, and thereby misalines the intermediate turns of the helical contacts as shown at 17. The disc 15 may be fastened to the receptacle 10 in any suitable manner, for instance, as shown in the drawing, by a screw 18 passing through the axis of the disc and the receptacle and being fastened at the lower end by a nut 19 located in the counter-sunk portion 20 of the receptacle 10. This arrangement provides a compact socket in which the misalinement of the intermediate turns of the helical contacts provides a large surface contact for the terminal pins 21 of the vacuum tube base 22. This arrangement also overcomes the necessity of accurate dimensions of the helical contact 13 and the terminal pin 21, since the offset or misalined portion 17 compensates for small differences of diameters between the terminal pin 21 and the contact 13. Furthermore, the tapered portion adjacent the apertures 16 in the disc provides a guiding means for centering the terminal pins 21 of the vacuum tube base 22. The socket of this invention is also arranged to receive the present type of vacuum tubes, in which two of the terminal pins are of larger diameter than the other two, to prevent the wrong engagement of the terminal pins with their respective contacts. This is clearly shown in Fig. 2.

Referring to Fig. 3, the vacuum tube socket of this invention is shown with the terminal pins 21 inserted in the contacts 13, to illustrate the large surface contact obtained with the improved helical contact of this invention. The insertion of the terminal pins into the helical contact tends to aline each adjacent turn of the contact and exert a twisting motion around the terminal pin 21, thereby insuring large surface and positive contact.

A modified form of socket is shown in Fig. 4, in which the receptacle 10 is provided with apertures 23 corresponding to the apertures 16 in the disc 15 of Fig. 1. The chambers 11 are open at their lower end to receive the helical contacts 13 with the tapered portion of the contact fitted into a recess coaxial with the apertures 23. The contact terminal 14 is attached to the last turn of the helical contact 13 by soldering, and projects at right angles through the wall of the receptacle 10. A disc 24 closes the chambers 11 and compresses the contact 13 to misaline the intermediate turns thereof in the same manner as described in connection with Fig. 1. The clamping screw 18 passes through the center of the receptacle 10 and the disc 24, and is fastened thereto by means of a nut 19.

While the helical contact has been disclosed with a separable terminal extension soldered or affixed to either end of the helix, it is apparent that modifications can be made in the structure as shown in Fig. 5, in which the terminal and helical contacts are integral. In this arrangement the terminal 25 is formed by providing a right angle continuation of the wire helix 13 and forming a loop 26 at the end thereof to which external connections may be made. Furthermore, the invention is not limited to a vacuum tube socket since other receptacles may be made with the novel helical contact arrangement without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. An electric terminal socket comprising a helical contact member and a supporting member therefor, said helical member having an intermediate portion normally offset with respect to the end portions thereof.

2. An electric terminal socket comprising a wire helix, a supporting member therefor, and an apertured member, said helix having a guiding portion adjacent said apertured member and an offset portion.

3. An electric terminal socket comprising a wire helix, a supporting member therefor, and a member having an opening therein, said helix having the ends thereof in alinement with the opening in said member, and a portion misalined with respect to said opening.

4. An electric terminal socket comprising a wire helix, a supporting member therefor, and a member having an opening therein, said helix having the ends thereof in alinement with the opening in said member and an intermediate portion misalined with respect to said opening, the turns at one end being of larger diameter than the turns at the other end.

5. An electric terminal socket comprising a supporting member a wire helix, therein, and means bearing on said helix to offset a portion thereof.

6. An electric terminal socket comprising a supporting block, an apertured block, and a plurality of closely wound wire helices having misalined turns compressed between said blocks.

7. An electric terminal socket comprising an insulating block, an apertured insulating block, a plurality of wire helices between

said blocks, and fastening means engaging said blocks to misaline the turns of said helices.

8. An electric terminal socket comprising an insulating supporting member, a plurality of closely wound wire helices therein, said helices normally projecting beyond said member, and a plate closing said supporting member, said plate engaging said helices to misaline the turns thereof.

9. A socket for a vacuum tube having terminal pins, said socket comprising a receptacle of insulating material, resilient wire helices in said receptacle, a plate for said receptacle, and means for fastening said plate thereto, said helices being compressed and misalined in said receptacle by said plate and adapted to be realined by the insertion of said terminal pins therein.

10. A socket for a vacuum tube having terminal pins, said socket comprising a receptacle of insulating material having internal chambers, resilient wire helices in said chambers, a member having perforations therein, a portion of said helices being misalined with respect to said perforations and adapted to be realined by the insertion of said terminal pins of said tube.

In witness whereof, I hereunto subscribe my name this 27 day of April, A. D., 1926.

ALBERT F. F. GILSON.