April 16, 1929. C. E. FITCH 1,709,393

RADIO VACUUM TUBE CONSTRUCTION

Filed May 6, 1926

Fig 1.

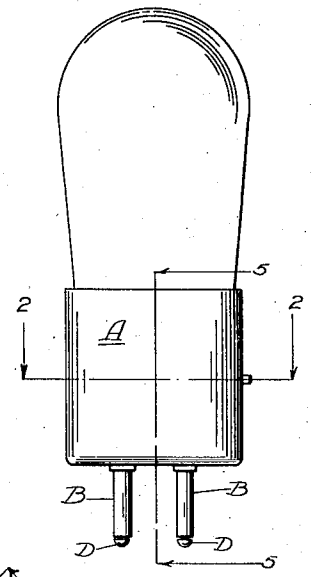


Fig 2.

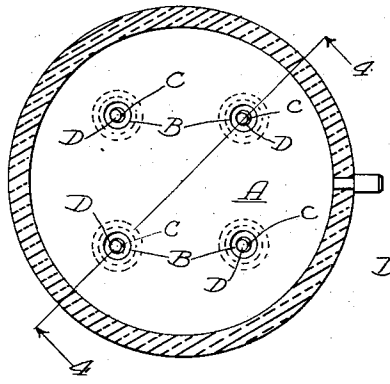


Fig 3.

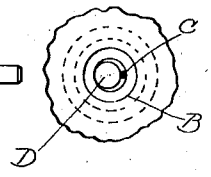


Fig 4.

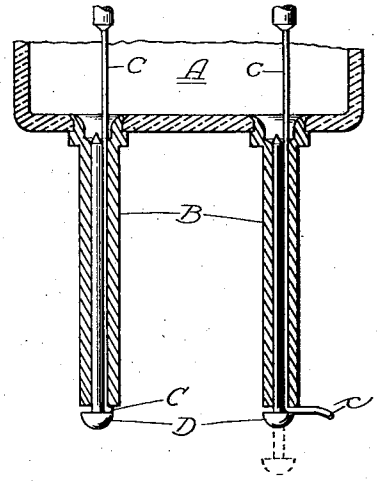


Fig 5.

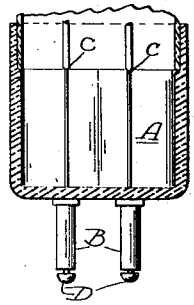
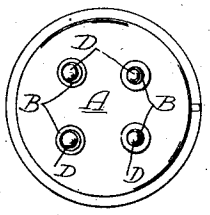


Fig 6.



Witness.
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by Burton & Burton
his Attorneys.

Patented Apr. 16, 1929. 1,709,393

UNITED STATES PATENT OFFICE.

CLAUDE E. FITCH, OF WILMETTE, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO RAYTHEON MANUFACTURING COMPANY, OF CAMBRIDGE, MASSACHUSETTS, A CORPORATION OF DELAWARE.

RADIO VACUUM-TUBE CONSTRUCTION.

Application filed May 6, 1926. Serial No. 107,131.

The purpose of this invention is to provide an improved form and character of contact terminal of radio vacuum tube, and an improved method of ensuring the conductive junction between the inleading wires and the terminal pins by which the circuit contacts of the tube are made when it is mounted in the socket, or other circuit-connecting support. It consists in the elements and features of construction and method shown and described, as indicated in the claims.

In the drawings:—

Figure 1 is an elevation of a radio vacuum tube of familiar form and construction, but having the terminal contact pins constructed according to this invention.

Figure 2 is a magnified section at the line 2—2 on Figure 1.

Figure 3 is a still more magnified detail showing the inner end of one of the tubular terminal pins as seen from the inside of the tube base, with leading wire and securing pin, which constitutes the characteristic of this invention, shown in position in the tubular terminal.

Figure 4 is a section at the line 4—4 on Figure 2.

Figure 5 is a section at the line 5—5 on Figure 1.

Figure 6 is a bottom plan view of the tube.

In the drawings, A represents the base of the vacuum tube, made usually of hard rubber, bakelite or the like, having the metal tubular terminal pins, B, made rigid with the end of the base in any suitable manner for having the inleading wires, C, pass through the axial cavities of the pins, B, respectively, from within the cavity of the base before the base is joined to the bulb.

The customary means and method of effecting sure conductive junction between the inleading wire and the terminal contact pin through which the wire extends as above described, is to solder the wire to the pin at the end of the latter, that is, at the emergence of the wire from the end of the axial cavity of the pin. This method has been found objectionable because of the difficulty of obtaining perfect uniformity in the size and protrusion of the little lumps of solder technically called "beads" which become deposited at and protruding from the ends of the several pins (usually four); and in instances in which a larger lump is formed on the one pin than on the others, it is liable to occur that the other pins having less protruding lumps will fail to make contact with their respective co-operating contacts in the socket, because the more protruding terminal solder lump of the first pin holds the others out of contact. And in other instances in which the socket for the tube has individual small sockets for the several pins, a solder lump on any one of the pins protruding a trifle laterally beyond the diameter of the pin, prevents that pin from entering its socket and so keeps the other pins out of circuit-closing position.

These difficulties and defects are overcome and avoided in the present invention by providing a slender securing pin, D, commonly called an escutcheon pin diametered for fitting tightly in the axial cavity of the tubular contact pin when the inleading wire is also therein, said securing pin having a rounded head adapted, when the securing pin is forced into the axial cavity of the tubular contact pin alongside the circuit wire therein, to stop on the ends of the tubular pin and on the out-turned end portion of the wire, and pinch and flatten the wire securely against the inner wall of the axial cavity of the tubular pin, and also pinch the out-bent end portion of the wire against the end of the tubular pin as seen in Figure 4, wherein there is shown at the right end of the two tubular pins, seen in that figure, the protruding portion, *c*, of the inleading wire as it may be seen protruding for a substantial distance while the securing pin is being forced in, said protruding portion of the wire being bent aside to form a hook engaging the end of the tubular pin, so that the wire will not be liable to be drawn in by the friction of the securing pin in forcing the latter member. At the left hand of the two tubular contacts shown in this figure, the inleading wire is shown as it appears when the process of securing it is finished, the excess protruding portion of the wire having been clipped off close to the head of the securing pins.

Beside the advantages incidentally indicated above, the method described consisting in securing the inleading wires in the tubular inleads by pin instead of soldering at the ends, has the following advantages:

(1) Avoidance of the soft metal (solder)

for making the contact and substituting a metal not so liable to be abraded by unnecessary force which is liable to be used in thrusting the tube into socket, or to become oxidized introducing greater electrical resistance, or to be fused as will occur in case of imperfect contact, which imperfect contact is particularly likely to be caused by the jamming and flattening or abrading of the solder terminal of one or more of the contact pins which are thereby held out of contact by the others which are not reduced in length.

(2) Avoidance of the formation of a thermo-electric couple which is involved in the use of the soft metal (solder) in junction with the brass or bronze, which tends to generation of electric current which, particularly in the case of a tube having filament energized by alternating current, interferes very seriously with the efficiency of the tube for receiving, the pulsations of the current generated through the thermo-electric couple producing noises which sound like "static", and often entirely defeat the utility of the tube for receiving.

(3) The flattening of the wire by the escutcheon pin, beside pinching it into secure contact with the tube, deforms it, causing it to be spread over the surface of the tube as well as over the surface of the pins, very substantially increasing the area of contact and reducing the electric resistance.

I claim:—

1. A vacuum tube base having a tubular metallic contact pin protruding therefrom for making circuit-closing contact; inleading circuit wires extending through the base and out through the tubular contact pin, and a headed pin which is fitted tightly in the axial cavity of the tubular pin alongside of the clamps the wire extending therein throughout said extent and having its head extending over the end of the tubular pin; whereby such headed clamping pin forced into the tubular contact pin until the head is stopped on the end of the latter, serves for clamping the inleading wire into contact with the tubular pin, and by its head affords suitable contact terminal for the tubular pin.

2. A vacuum tube base having a tubular metallic contact pin protruding therefrom for making circuit-closing contact; an inleading circuit wire extending through the base and out through the tubular contact pin and folded outwardly across the thickness of the tube base, and a headed clamping pin which is fitted tightly in the axial cavity of the tubular pin alongside the wire therein, with its head extending over the end of the tubular pin and being stopped thereby with the out-folded end of the wire pinched between said head and the end of the tube.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 3d day of May, 1926.

CLAUDE E. FITCH.

CERTIFICATE OF CORRECTION.

Patent No. 1,709,393. **Granted April 16, 1929, to**

CLAUDE E. FITCH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 42, claim 1, for the article "the" first occurrence, read "and"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of May, A. D. 1929.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)

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