June 2, 1936. W. MAKENNY 2,042,950

RADIO TUBE BASE

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Fig. 1.

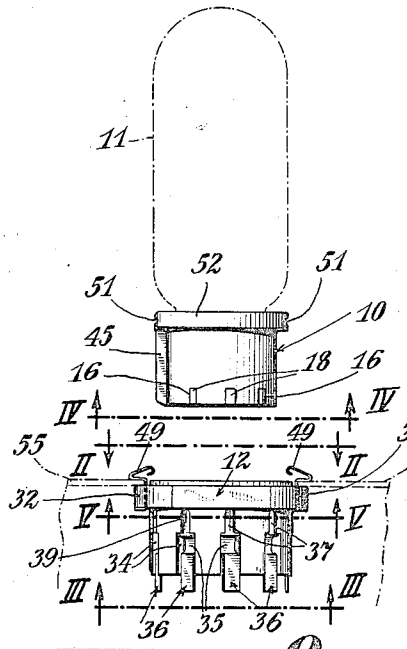


Fig. 2.

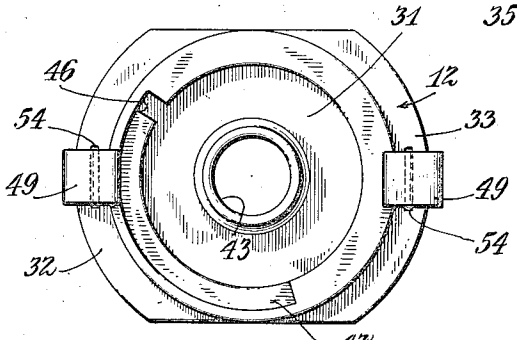


Fig. 9.

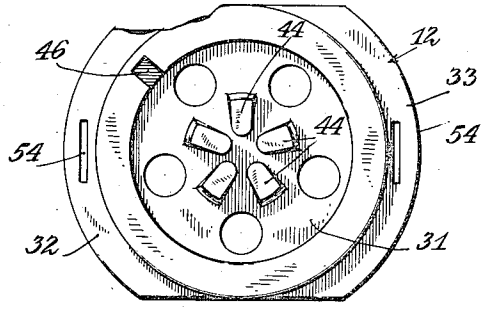


Fig. 6.

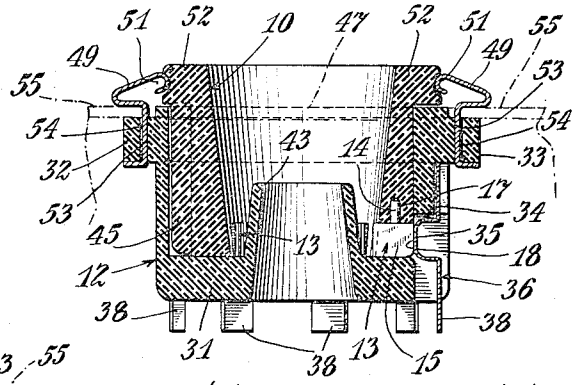


Fig. 7.

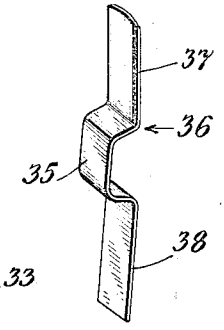


Fig. 11.

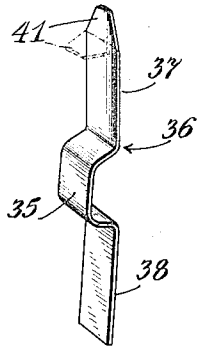
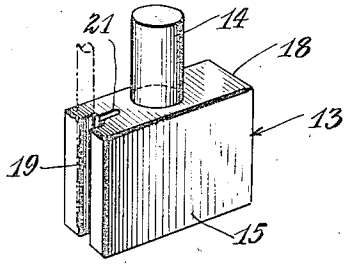


Fig. 8.



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Fig. 3.

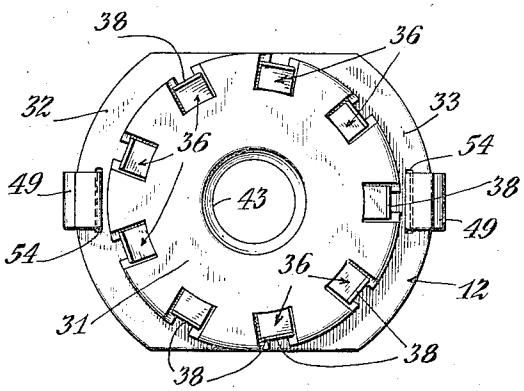


Fig. 14.

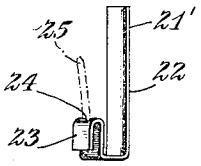


Fig. 15.

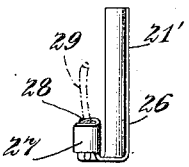


Fig. 10.

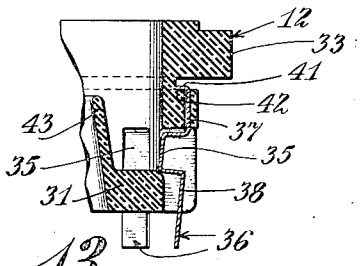


Fig. 5.

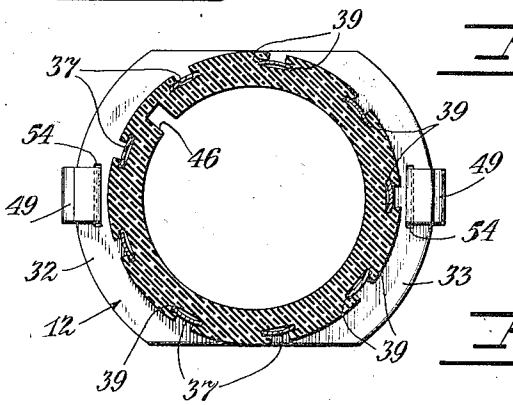


Fig. 13.

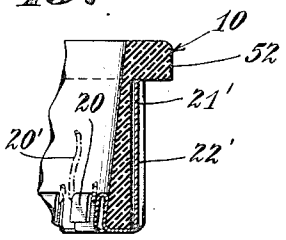


Fig. 4.

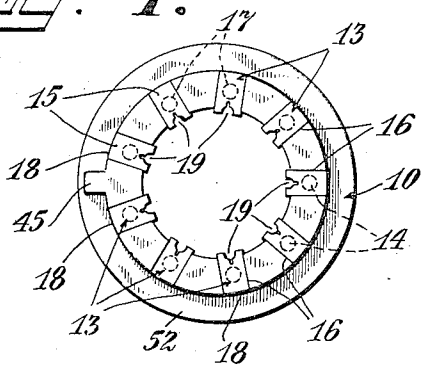
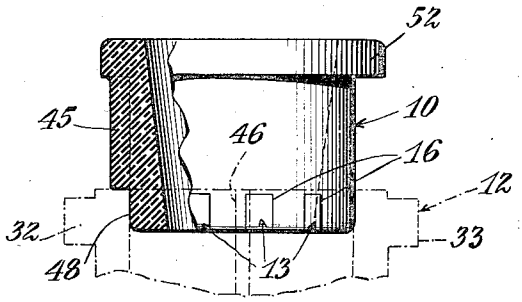


Fig. 12.



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UNITED STATES PATENT OFFICE

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RADIO TUBE BASE

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Application May 16, 1933, Serial No. 671,302

5 Claims. (Cl. 250—27.5)

This invention relates to an electrical vacuum device and relates more particularly to a vacuum tube base and a socket to receive a base. Although the present invention is applicable to various types of vacuum tubes it will be shown and described as applied to a radio receiving tube.

Radio tubes are usually made with a base having tubular contact pins projecting from a bottom wall thereof and sockets are provided with apertures to receive the contact pins and the tube is then supported and held in electrical connection with a circuit.

Developments in the art of radio tube manufacture have brought about certain changes in radio tube constructions whereby the number of contact members have been greatly increased and, whereas four or five contact members were usually employed, certain improved types of tubes are provided with additional internal elements making it necessary to provide the tube with from seven to nine or more external contacts. Furthermore, the tendency is to reduce the size of the tube so that it will meet the proportions of small-sized receiving sets.

In many types of radio tube receiving sets, particularly sets of relatively small size, the sockets are secured in spaced relation in apertures in a plate or supporting structure which is termed a chassis.

In small-sized receiving sets it becomes a problem to properly arrange the contacts, particularly when a great number are employed to obtain the necessary intimate contact to provide the required electrical connection. As shown in my copending application Serial 667,215 filed April 21, 1933, for Radio tube base and socket, it has been found desirable to make the socket in the form of a cup to receive a base having external contacts.

When a socket is made of cup shape with the contacts exposed along the inner wall, I have found it of advantage to provide means for guarding the several contacts against the danger of short-circuiting, as for example, if an object should be dropped into the socket and to prevent personal injury resulting from a short-circuiting if a user should accidentally insert a finger or fingers into the socket.

When providing a socket with the necessary barrier or guarding means, it is desirable from a practical standpoint to arrange the contacts of the socket so as to extend from the inner surface thereof in a circular or staggered row adjacent to the bottom wall of the socket. With this construction of socket it is essential to provide a base with the contacts thereof disposed along the bottom edge. The present invention also provides means to facilitate the insertion of the base into a socket to enable a key on the base to be quickly and conveniently aligned with a keyway in the socket.

The invention will be more fully understood from the accompanying drawings in which

Fig. 1 is a side elevational view of a base and socket constructed in accordance with the present invention;

Fig. 2 is a view taken on line II—II in Fig. 1;

Fig. 3 is a view taken on line III—III in Fig. 1;

Fig. 4 is a view looking toward the bottom of the base taken on line IV—IV in Fig. 1;

Fig. 5 is an enlarged transverse cross sectional view taken on line V—V in Fig. 1;

Fig. 6 is an enlarged vertical sectional view of a socket with the base inserted therein;

Fig. 7 is a perspective view of one of the socket contacts;

Fig. 8 is a perspective view of one of the base contacts;

Fig. 9 is a top plan view of a socket showing a modified form of a guard or barrier;

Fig. 10 is a fragmentary vertical sectional view of a portion of a socket showing a modified form of contact having one end bent inwardly;

Fig. 11 is a perspective view of the contact shown in Fig. 10 the position of the end after bending being shown in dotted lines;

Fig. 12 is a side elevational view of a base with the socket shown in dotted lines, the base being partly in section with a keyway so arranged as to move along the top of the base to enter the keyway when a portion of the base is inserted in the socket;

Fig. 13 is a fragmentary view of a base partly in section and showing a modified form of contact in which the vertical portions of the contact are disposed in slots in the side of the base and the ends are bent up to provide overlapping portions to receive lead wires;

Fig. 14 is a perspective view of a contact similar to that shown in Fig. 13 but in which an aperture is provided between two overlapping portions to receive the end of a lead wire; and

Fig. 15 is a perspective view of a modified form of contact shown in Fig. 13 and having a laterally bent portion whereby the lead wire may be engaged between two metallic pieces.

The selected embodiment of the invention, as illustrated, may comprise a body preferably of tubular form of suitable insulative material con-

stituting a base 10 for a radio tube or other device, the bulb 11 of which is indicated in dotted lines. The base 10 is so proportioned as to be adapted for insertion into a cup-like socket 12 which may be of any suitable insulative material. The base 10, as shown, is provided with a plurality of contact members 13. These contact members, as shown more clearly in Fig. 8, may comprise a shank 14 and a head 15 preferably of oblong shape in transverse cross section.

The base 10, which is of tubular form, may have its bottom edge provided with slots 16 to receive the heads 15 and with apertures 17 into which the shanks 14 of the contacts may be disposed in a forced fit. The contacts 13, arranged as just described, permit the exposure of surfaces 18 thereof along the outer surface of the bottom edge of the base and in position to be engaged by contacts in the socket. The contacts 13 may be considered solid contacts and the ends of lead wires extending from the base, are soldered or welded thereto. These contacts may, however, be made of sheet metal as shown and hereinafter described.

It will be appreciated that when a base is made having a large number of lead wires as for example eight or more, that a problem is presented in finding a way to expedite and reduce the labor necessary to secure the lead wires to the contacts. This operation may be facilitated by providing the contacts with means for receiving the lead wires as for example the contact shown in Fig. 8 may be provided with a groove 19 in which the lead wire may be disposed. The contact may be split at 21, if desirable, and so that the lead wire may be snapped into place and held temporarily, prior to a soldering or welding operation.

With this construction it will be evident that the base may be provided with the necessary basing cement which secures the base to the bulb and the lead wires may be disposed to project through the open end of the base. After the bulb and base have been cemented together the operator may then take the device and simply dispose the lead wires in the slots provided in the contacts and perform the soldering or welding operation. Although the welding or soldering operation may be performed as each lead wire is positioned on a contact, it is possible, by reason of the present construction, to temporarily secure each lead wire to a contact after which the welding or soldering operations may be performed either simultaneously or in rapid succession.

The provision of contacts having means for temporarily holding the lead wires in position for a soldering or welding operation makes the construction one which readily lends itself to automatic operation.

It is desirable, when performing a welding operation, to dispose the end of the lead wire between two metallic portions in a contact. In Fig. 13 a base contact is shown having a reversely bent portion 20 to provide a clip to receive the lead wire 20'. In Fig. 14 a contact 22 is shown having an inversely bent portion 23 provided with an aperture 24 at the bend through which the end of a lead wire 25 may be inserted. The end of the lead wire is thus disposed between two metal portions which may be pressed together during a welding operation.

Fig. 15 shows another form of base contact member 26 having a lateral projection or flap 27 extending over a flat portion 28 so that a lead wire 29 may be disposed between two metallic portions for welding operation. It will be noted that the base contacts may be arranged to engage with contacts projecting from the inner surface of the wall of a socket 12. The contacts shown in Figs. 13 to 15 are provided with attaching portions 21' which portions may be of arcuate form in transverse cross section and may be frictionally held in dovetail grooves 22' in the manner shown and described in my co-pending application referred to above.

The cup-like socket 12 may be provided with a bottom wall 31 and with flanges 32 and 33 extending from the mouth of the cup. As shown, the present form of socket is provided with lateral openings 34 through which portions 35 of contact members 36 extend. The contact members 36 are, as more clearly shown in Fig. 7, formed from a strip of sheet metal and may be provided with attaching portions 37 of arcuate form in transverse cross section and with extensions 38 to which conductive wires may be attached to connect the socket with the circuit in which it is used.

The outer surface of the cylindrical wall of the socket is provided with a plurality of dovetail grooves 39 into which the attaching portions 37 of the contact members 36 are inserted. The width of the grooves 39 are so proportioned, with respect to the widths of the portions 37 of the contact members, that the said members are held in position by frictional and tensional engagement.

If desirable, the portions 37 may, as shown in Fig. 11, be provided with tip 41 adapted to be bent at right angles, as shown in dotted lines, to engage either in a notch or with a shoulder 42, as shown in Fig. 10, to more securely hold the contact in position. As shown in Fig. 10, the contact member may be bent at an angle to the path of movement of the contacts on the base so as to provide a greater tensional engagement with the contacts on the base. The contact portions 35 are disposed in circular arrangement around the inner wall of the base and in close relation to the bottom wall 31.

Ordinarily, it would be possible for anyone to accidentally insert a finger or an instrument which might span the space between opposite contacts resulting in a short circuit. For the purpose of preventing this, I provide guard means in the form of either a solid body or a hollow extension 43. This extension, which may be termed a guard or barrier, extends upwardly a distance sufficient to prevent any object from extending directly across between opposite contacts of the socket and confines the contacts in a relatively narrow annular space which may be just large enough to receive the lower end of the tubular base. The extension 43 may be of conical like formation, as shown in Fig. 6, or it may consist of a number of effectively positioned extensions or lugs 44, as shown in Fig. 9.

It is evident that when applying a base to a socket certain contacts of the base must always engage predetermined contacts in the socket. For this purpose the base is made with a key 45 and the socket is provided with a keyway 46. For the purpose of facilitating the insertion of the base into the socket, the socket is provided with a ledge 47 extending from the keyway 46 partially around the edge of the mouth of the socket.

When a base is to be inserted it is rotated until the key 45 engages the ledge which serves to

guide the key into the keyway. The entrance of the key into the keyway may also be facilitated by forming the keyway, as shown in Fig. 12, so that it does not extend to the lower end of the base leaving a portion 48 of the base for insertion into the socket. The tube and base may then be rotated until the key engages the keyway 46 for the insertion of the base into position.

For the purpose of locking the base on the socket, means may be provided in the form of tensional members 49 the free ends of which may enter notches 51 in a flange 52 on the base. The members 49 may be provided with extensions 53 which are disposed in slots 54 in flanges 33 of the socket and serve to secure the socket to a supporting plate 55.

From the foregoing it will be evident that the present invention provides a novel form of electrical fitting comprising a base and cooperating socket and that the base may be readily molded and of suitable material and equipped with contact members. The socket may be molded or otherwise formed of suitable insulating material and, by reason of the provision of the guard or barrier and the arrangement of the contacts, a socket is provided wherein the danger of accidental short-circuiting is avoided.

Although the present construction is shown and described as applied to a radio tube base having a large number of contact members, it is to be understood that the invention is equally applicable for use with devices wherein a base and socket are required and a greater or lesser number of contact elements may be employed.

The present embodiment of the invention herein discloses a selected example of a practical construction but it is to be understood that modifications may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A base for a vacuum tube comprising an insulating tubular body, a radial slot at one end of said body, a contact member so proportioned as to occupy said slot with at least one surface of said member flush with an outer surface of said body.

2. A base for a vacuum tube comprising an insulating tubular body, notches in spaced relation around one end of said body, contact members so proportioned as to occupy said notches with the sides of said contacts flush with the outer surface of said body.

3. A base for a vacuum tube comprising an insulating tubular body, notches in spaced relation around one end of said body, contact members so proportioned as to occupy said notches with sides of said members flush with the outer surface of said body, said members projecting from the inner surface of said body and having means for securing lead wires.

4. A socket for a vacuum device comprising a tubular body, said body having an aperture through the wall thereof, a slot extending from said aperture and disposed longitudinally of said body, a contact member having a straight portion frictionally retained in said slot and a bent portion extending through said aperture to present a contact surface substantially flush with the surface of the wall of said body.

5. A socket for a vacuum device comprising a tubular body, said body having a plurality of apertures through the wall thereof and in spaced relation around the body, a slot extending from each aperture longitudinally of the body, contact members, each contact member comprising a metallic strip having end portions disposed in a common plane and a contact portion offset with respect to said end portions, one of said end portions being disposed in a slot to hold said contact portion positioned in said aperture, said other end portion extending from the end of said body.

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