Aug. 11, 1925. 1,549,355

J. J. GHEGAN

VACUUM TUBE CONTACT

Filed Feb. 12, 1924

Fig. 1.

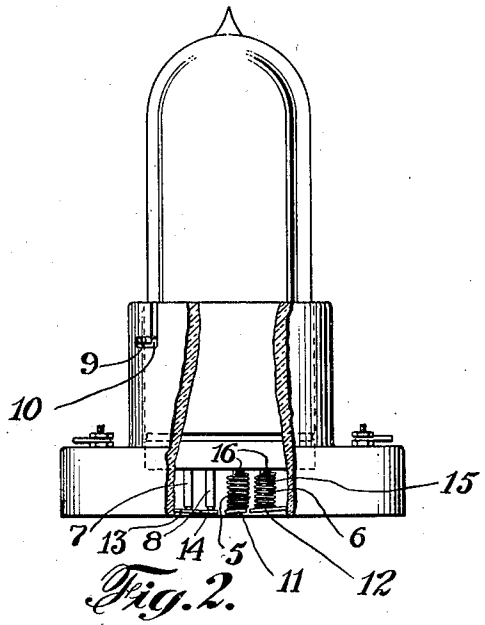
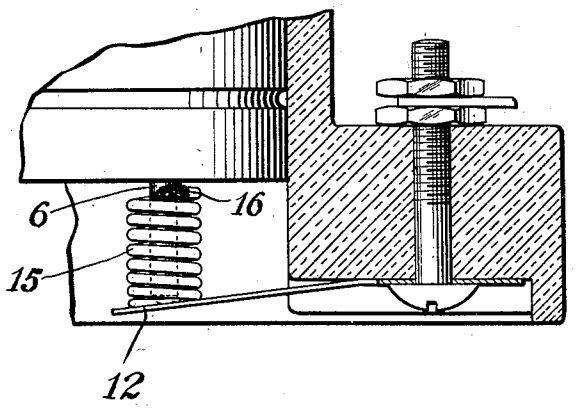


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN J. GHEGAN, OF EAST ORANGE, NEW JERSEY.

VACUUM-TUBE CONTACT.

Application filed February 12, 1924. Serial No. 692,271.

To all whom it may concern:

Be it known that I, JOHN J. GHEGAN, a citizen of the United States, and a resident of East Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Vacuum-Tube Contacts, of which the following is a specification.

The present invention relates particularly, but not exclusively to vacuum tubes of the type such as are used in radio receiving sets. These tubes have contacts in the form of projecting prongs designed to engage correspondingly located spring contact strips in the sockets which are provided to receive such tubes. The area of engagement between the ends of the prongs and the socket contacts is quite limited because of the small size of the prongs and the angle to which the socket contacts are deflected by the prongs when the tube is forced down to its seat in the socket. This limited area of contact frequently gives rise to trouble in the set because of the oxidation which takes place at this point, particularly with rises in current value, which occur during operation of the set. This connection also is an inherent weakness in the set because of the readiness with which it is affected by the presence of dust and moisture.

The objects of this invention are to overcome this weakness and to provide in simple, practical form, a means for establishing and maintaining a full-area perfect connection between the contacts of the tube and socket.

The foregoing and other objects are attained in the present invention by a novel construction and relation of parts, the details of which will fully appear in the course of the following specification.

In the drawing accompanying and forming part of this specification, the invention is illustrated in one of its simplest embodiments, Figure 1 being a part sectional side elevation showing a vacuum tube equipped with the invention, engaged in its socket and Figure 2 being an enlarged fragmentary view showing in detail the engagement of the cooperative tube and socket contacts.

The tube illustrated is of a standard type having projecting filament contact studs 5, 6 and similar plate and grid contacts 7, 8, together with a projecting pin 9 on the side of the tube base for insuring proper registry with the socket contacts.

The socket illustrated likewise is of a well-known type, shaped to receive the base of the tube and having a slot 10 in one side to receive the positioning pin and thereby bring the contact pins of the tube into engagement with the spring contact strips 11, 12, 13, 14 of the socket.

To insure as firm as possible an engagement between the contact pins and springs and assure engagement of all the pins with all the springs, the parts are usually so designed that the tube will be pushed down in the socket far enough to actually deflect and bend the springs downwardly in the manner illustrated. This angularity of the springs, it will be observed, further reduces the possible area of contact between the springs and pins.

In the embodiment of the invention here illustrated a fully effective and lasting contact is made by surrounding the contact pin with a helical spring 15 of bronze or other good conducting material, and which is sufficiently resilient and enough larger than the pin to adjust itself to the angularity of the contact spring to seat itself flat against the face of the spring after the manner indicated in Figure 2. One or a number of these springs may be used on each tube, as found desirable. Usually, however, at least the two filament contacts will be so equipped to insure a full current supply to the filament.

The helical springs are preferably secured at their upper ends in some fixed or permanent manner, as by soldering them to the contact pins, as indicated at 16. This provides perfect conductivity between the contact pins and the surrounding springs and also prevents the springs from dropping off when the tubes are removed from the sockets. The convolutions of the springs should be somewhat separated when unconfined and the springs should be secured in such position that the lowermost convolution will be projected beyond the end of the pin. These features with the looseness of the spring about the pin enable the spring to automatically adjust itself and seat firmly on the contact strip regardless of the relative angularity between the two. The lower end of the spring is usually faced off flat so that substantially a full convolution will lie in engagement with the socket contact.

The helical contact springs are relatively inexpensive, can be easily applied to existing forms of tubes and provide a perfect

and lasting contact relation between the tube and socket elements. This prevents the development of high resistance points in the tube and socket connections and makes this part of the set just as highly conductive as the soldered and other permanent joints provided in the balance of the set. With the more perfect conductivity afforded by this invention, it has been found that a receiving set becomes more selective and more efficient in every way.

What is claimed is:

1. A vacuum tube having contact pins and helically coiled springs engaged on said pins, means for fixedly securing said coiled springs on said pins at the ends nearest the base of the tube, said coiled springs having contact making end portions loosely surrounding the pins and projecting beyond the ends of the pins when unrestrained to thereby form self-adjusting contacts movable longitudinally and laterally with respect to the pins to automatically adjust themselves in flat face engagement with angularly related spring contact strips of a tube socket.

2. A vacuum tube having a projecting pin contact and a helically coiled spring engaged on such pin, means for fixedly securing said coiled spring to the pin at the end nearest the base of the tube, the balance of said spring being freely adjustable about the pin with the end of the spring projecting when unrestrained beyond the end of the pin.

3. A vacuum tube having a projecting pin contact and a helical auxiliary spring contact loosely surrounding said pin and having a portion adjacent the base of the tube secured to the pin by a permanent soldered joint.

4. A thermionic tube having projecting pin contacts for the filament and auxiliary coiled spring contacts concentrically engaged on and carried by said filament pin contacts, and means for fixedly securing said coiled spring contacts on the pin contacts.

5. A thermionic tube comprising a base, terminal prongs carried by said base, auxiliary resilient contact means carried by said prongs, means for fixedly securing the same on the prongs, said contact means tending to project beyond said prongs whereby to engage socket contacts engaged by the prongs and thereby lower the contact resistance.

In witness whereof I have hereunto set my hand this 8th day of February, 1924.

JOHN J. GHEGAN.