April 19, 1932. F. H. KROGER 1,854,203

CONTACT

Filed July 24, 1930

Fig. 1.

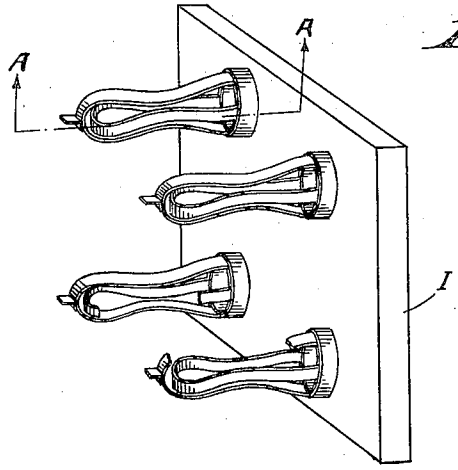


Fig. 2

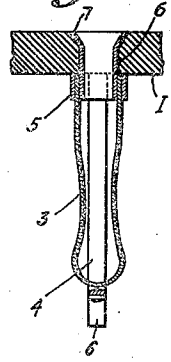


Fig. 3

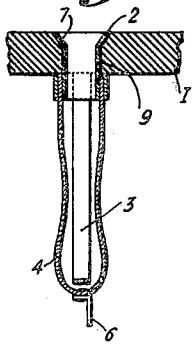
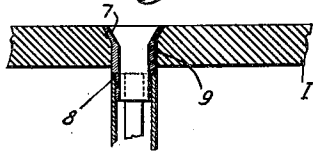


Fig. 4



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UNITED STATES PATENT OFFICE

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Application filed July 24, 1930. Serial No. 470,311.

This invention relates to radio apparatus and in particular to a device for holding vacuum tubes in position and for making electrical contact with the prongs on said tubes attached to elements within said tubes.

In radio apparatus of the above description known heretofore considerable difficulty has been encountered due to the fact that the contact making members and the tube base retaining member in use heretofore are not durable in nature and do not in the first case provide a good low resistance contact between the contact members and the plugs on the socket over a period of time nor retain the tube in position properly. Especially are the above disadvantages present when the apparatus is to be used on aircraft work or in any kind or work in which the radio apparatus including the tubes and contacts is subject to jars and other rough usage.

Another disadvantage present in apparatus of the above nature lies in the fact that the tube sockets known heretofore are of such design that they require more space than the outline of the tube base. This is due in part to the structure of the socket and in part to the fact that the connections between the contacts in said base and the circuits associated with said tube are made by way of contact members extending in a direction perpendicular with the axis of the tube which contact members extend beyond the outline of the tube base. This is a disadvantage which is very undesirable in work as for instance aircraft work where the radio apparatus must be confined to a minimum amount of space.

A further disadvantage attendant on the use of radio apparatus of the above nature known heretofore lies in the fact that such apparatus is large and heavy thereby increasing the load necessary for the aircraft to lift.

A further disadvantage present in apparatus known heretofore is due to the fact that contact between the prong on the tube base and the contact member is made at only two points and soon becomes a high resistance contact in use.

The above disadvantages are overcome in accordance with the present invention by the use of a contact member which insures a good connection at four points between the prong on the tube socket and the contact, which is extremely light in weight and takes up a minimum amount of space and which retains the tube in position.

More in detail, the above defects in apparatus in the prior art are overcome by providing contact members which comprise a metallic ring, two metallic hairpin shaped members each having its free ends soldered or pinned to the metallic ring at points spaced on the periphery of said ring. The ring or cylinder may be inserted through a non-carbonizing strip of insulation in the desired position and retained therein by spinning down the end of the ring remote from the contact members. The insulation strip may be counter-sunk so that when the ring is spun down it is flush with the surface thereof. The connector leading from the contact to the circuit in which the thermionic tube is used, is made by soldering it to a point on one of said metallic strips remote from the ring.

Obviously, a socket may be built up by using the required number of contacts as described above and the contact members necessary to retain the tube in position and make contact with the prongs thereon will all be within the area outlined by the tube base.

In a modification, the metallic contact members may be set into a recess in the ring member and pinned therein or hard soldered therein.

While a preferred embodiment of the invention has been disclosed for purposes of illustration it should be understood that various changes may be made in the structure thereof without departing from the spirit and scope of the invention as set forth in the claim appended hereto. The invention, however, will be better understood by a reading of the following detailed description and therefrom when read in connection with the attached drawings in which;

Figure 1 shows in perspective a tube socket built up by the use of contact members as disclosed in the present invention,

Figure 2 shows a cross section on the line AA of Figure 1,

Figure 3 shows a cross section at right angles to the section of Figure 2; while

Figure 4 shows a cross section of a modification.

Referring to the drawings and in particular to Figure 1 thereof, 1 indicates a piece of non-carbonizing insulation material which may be part of the radio apparatus or the frame thereof, 2 is a metal ring preferably of brass adapted to be inserted through an opening drilled in the appropriate position in 1, 3 is a metallic strip bent in the form of a hairpin and having each end soldered as shown in Figure 2 to the ring 2, 4 is a member similar to 3 except that it is fastened to the ring 2 at right angles with respect to 3 and extends beyond 3 enclosing the member 3 in the outer loop thereof. The members 3 and 4 are retained by means of a metallic ring 5 surrounding said members and rigidly fastened thereto. The distance between the legs of each of the hairpin members 3 and 4 varies, the distance depending on the size of the prong on the tube which is to be retained thereby and with which contact is to be made. The members 3 and 4 are of resilient material and heavy enough to grip the tube prongs tightly. The tube prong on insertion in the ring 2 is closely gripped on the four sides by means of the members 3 and 4. Connection between the contact members 3 and 4 described above and the circuits in the radio apparatus is made by means of a connector 6 soldered or pinned as shown to the tip of one of the members 3 or 4, preferably to member 4. As will be apparent from the drawings, the contacts necessary and the connectors thereto will all be within the circle outlining the tube of the base. This results in that the tubes may be positioned close together and require a minimum amount of space.

In Figure 2 which is a cross section along the line AA of Figure 1, the manner in which the ring 2 is retained in the opening in the member 1 is illustrated. The ring 2 is inserted in the opening 7 in the member 1 to a position at which the shoulder formed by the members 3, 4 and 5 abuts the member 1. The end 8 of ring 2 is spun down forming a flange projecting out over the member 1. This flange where desired may be made flush with the surface of 1 by counter-sinking the opening 6 in 1.

In Figure 4 is shown a modification which is similar in some respects to the modification shown in Figures 1 and 2. The arrangement in Figure 3 differs from the arrangement in Figures 1, 2 and 3 in that the ends of the members 3 and 4 are placed in recesses 9 in the ring 2 and soldered or pinned therein.

Having fully described and illustrated my invention what I claim is:—

A light weight socket structure comprising a tubular member adapted to be inserted in an opening in an insulating member, said tubular member having a shoulder adapted to abut one side of said insulating member and a flange adapted to abut the other side of said insulating member, a plurality of hairpin shaped resilient members each having its free ends fastened to said cylindrical member, and means for making a connection to one of said resilient members.

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