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J. F. LEE

1,944,186

MULTIPLE TUBULAR LEAD-IN

Filed Nov. 23, 1929

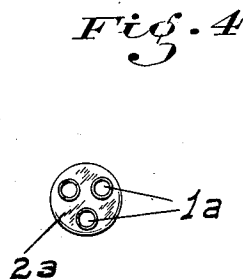
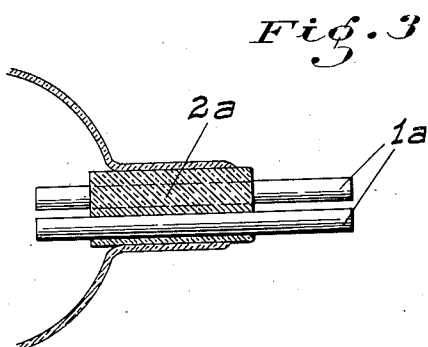
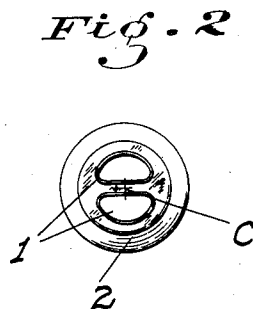
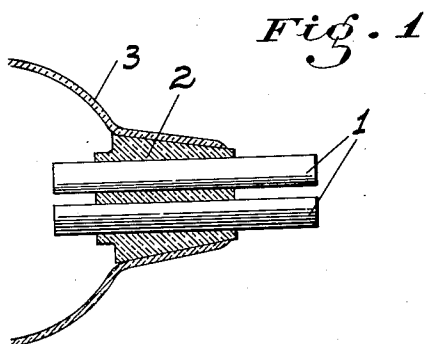


Fig. 5



Fig. 6



Fig. 7



Fig. 8

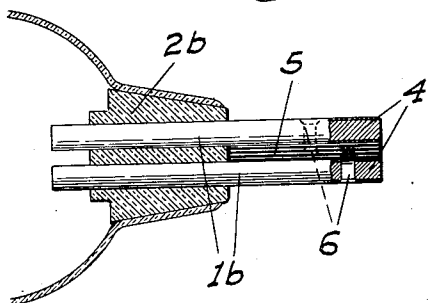
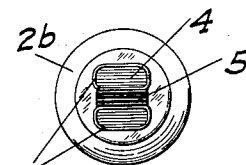


Fig. 9



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MULTIPLE TUBULAR LEAD-IN

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4 Claims. (Cl. 250—27.5)

This invention relates to the construction and arrangement of lead-ins for radio, vacuum, and similar tubes of all kinds.

The principal object of my invention is to construct and group such lead-ins relative to each other that a considerable number of the same may be grouped in a compact and symmetrical arrangement in and relative to the bead in which they are sealed; and so that the cross sectional area of the lead-ins may be relatively large compared with the corresponding area of the bead. By reason of this arrangement and partly on account of the particular construction of the lead-ins which I employ, not only are the above results obtained, but also, and what is of more importance, the tendency of the glass of the bead to fracture, either when making the same, or subsequently due to the heating of the lead-ins, is avoided; as well as the tendency of the lead-ins to slip or become unsealed from the bead. As a result leakages past the lead-ins, and which at present are of somewhat common occurrence, and the relatively bulky and non-symmetrical form of beads had if any considerable number of lead-ins is used, are eliminated.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a sectional elevation of one form of my improved lead-in unit.

Fig. 2 is an end elevation of the same.

Fig. 3 is a sectional elevation of another form of lead-in unit.

Fig. 4 is an end view of the same.

Figs. 5, 6, and 7 are end views of other modified shapes and arrangements of the lead-in elements.

Fig. 8 is a sectional elevation of a lead-in unit as arranged to be directly engaged with a socket.

Fig. 9 is an end view of the same.

Referring now more particularly to the characters of reference on the drawing, and particularly at present to Figs. 1 and 2, the numeral 1 denotes the lead-ins—tubular elements of thin and readily collapsed or bendable metal, such as copper, nickel, gold alloy, or any other suitable metal, which intermediate their ends are embedded in the sealing bead 2, which is adapted to

be inserted into and fused with the glass at the base of the tube 3.

The lead-ins are of symmetrical form and are symmetrically disposed relative to the center C of the bead which surrounds the same. Also the cross-sectional shape of the lead-ins is such that the glass is substantially evenly distributed between the lead-ins as well as about the same. To do this, with the use of a pair of lead-ins, as shown in this form, the adjacent faces of said lead-ins are flat while their opposed faces are curved and are substantially concentric with the periphery of the bead. As a result the lead-ins may be relatively large in cross-sectional area relative to that of the bead and a much more compact arrangement is obtained than if said lead-ins are circular or cylindrical, as is ordinarily the case, and are set in a circular bead of necessarily relatively large dimensions. The glass being evenly distributed about the lead-ins, there is less danger of cracking and uneven strains being had in the bead either during the forming of the same or when in use, due to the generation of heat in any lead-in. This is because the heat is immediately and evenly transferred to a considerable portion of the area of the glass. The corners of the lead-ins being all rounded regardless of their general shape otherwise, further danger of the glass cracking due to the presence of sharp cornered angles therein is eliminated. Also the metal of the lead-ins being very thin and flexible it can readily yield as the glass sets about the same instead of offering such resistance to the glass as would place it under severe internal strains and as would be the case with solid lead-ins. Said lead-ins being of metal and of tubular form and being insulated from each other by the intervening glass may be used as conduits for electrical conductors or may themselves form such conductors.

In the form and arrangement shown in Figs. 3 and 4, the bead 2a is of a straight cylindrical shape instead of having flaring or tapered sides, as in the first described type, and the lead-ins 1a are of cylindrical form. These are arranged in symmetrically spaced relation to each other and to the center of the bead which surrounds the same, as will be evident from Fig. 4.

Figs. 5 to 7 show different groupings and shapes of lead-ins, in all of which the desired compactness of arrangement and symmetrical relationship to the bead are maintained, as will be evident. In preparing or making up any of these units the number of lead-ins employed, and their shape and size of course will depend on the service

to which they are to be put. In any case heavy leads may be passed through the tubular conduits or lead-ins and welded, soldered or otherwise suitably sealed thereto by any desired means if they are used as the stems or lead-ins of a vacuum tube. This enables heavy currents to be passed through the metal to glass seals.

In Figs. 8 and 9, I have shown an arrangement suitable for use when it is desired to employ the outer ends of the lead-ins as socket prongs. In this construction a pair of the lead-ins 1b, of substantially rectangular but round cornered form, are disposed in parallel and spaced relation to each other in the bead 2b; the symmetrical relationship of the lead-ins to each other and to the bead being maintained as previously described.

The outer portions of the lead-ins are filled with metal 4 so as to be non-yielding, and a strip of insulation material is placed between the lead-ins outwardly of the bead. Said strip is secured to the lead-ins by screws 6 or the like arranged in spaced relation to each other so that there is no possibility of a short existing between said lead-ins through the securing screws.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A multiple lead-in seal structure comprising a glass bead and a plurality of metal tubes extending through and sealed into said bead, each of said tubes having at least one flattened side, a flattened side of each tube being adjacent and parallel to a flattened side of another of said tubes, adjacent tubes being separated in each instance by a glass partition which is an integral part of said bead.

2. A multiple lead-in seal structure comprising a glass bead and a pair of metal tubes extending through and sealed into said bead, each of said tubes being of approximately semi-circular cross-section, said tubes having their flat sides mutually adjacent but separated by a partition of glass forming an integral part of said bead.

3. A multiple lead-in seal structure comprising a glass bead and a pair of metal tubes extending through and sealed into said bead, said tubes each being in cross-section in the form of flattened cylinders (having two parallel flat sides), said tubes each presenting a flat side in parallel contraposition to a flat side of the other tube, said last mentioned flat sides being separated by an interposed glass partition forming an integral part of said bead.

4. A multiple lead-in seal structure comprising a glass bead and a plurality of metal tubes extending through and sealed into said bead, said tubes being arranged symmetrically about the axis of said bead, each of said tubes having two flat sides forming, conjointly, an angle the sides of which when extended converge at a point substantially co-incident with said axis.

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