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Suzuki

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[54] **ELECTRON TUBE SOCKET HAVING SPARK GAP STRUCTURE**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** ..... **313/51;** 313/325; 339/14 T; 339/143 T; 339/193 R

[51] **Int. Cl.²** **H01R 23/40**

[58] **Field of Search** ..... 313/51, 325, 313, 318; 317/69, 70; 328/8; 315/35, 36; 339/14 T, 143 T, 193 R

[56] **References Cited**

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[57] **ABSTRACT**

This invention relates to an electron tube socket which comprises a single insulation base body formed with a plurality of pin inserting through-holes positioned peripherally and spaced from each other. Terminal contacts each having a pin receiving portion are inserted into the pin inserting holes. An integral conductor portion is provided on each terminal contact and protrusions are formed in the conductor portions at the lower sides thereof. A grounding plate is positioned away from the conductor portions of said terminal contacts with a raised protrusion formed thereon. The grounding plate is positioned so that the protrusion formed on each of the terminal contacts overlies the protrusion on the grounding plate and lie along an axis which intersects or crosses the protrusion on the grounding plate when viewed in plan. In this way, an arc gap is formed between the overlying points of each terminal contact protrusion and grounding plate protrusion at the point of intersection of the longitudinal axis in plan view of the protrusions on the terminal contact and the grounding plate.

4 Claims, 6 Drawing Figures

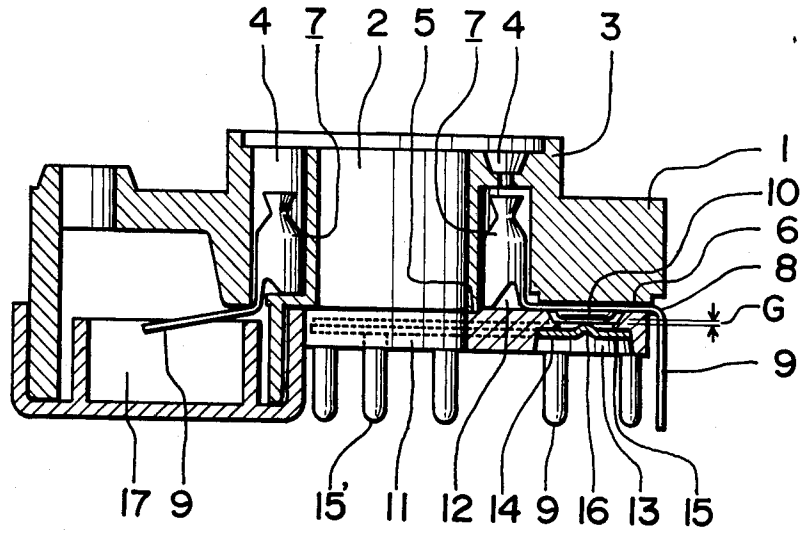


FIG. 1

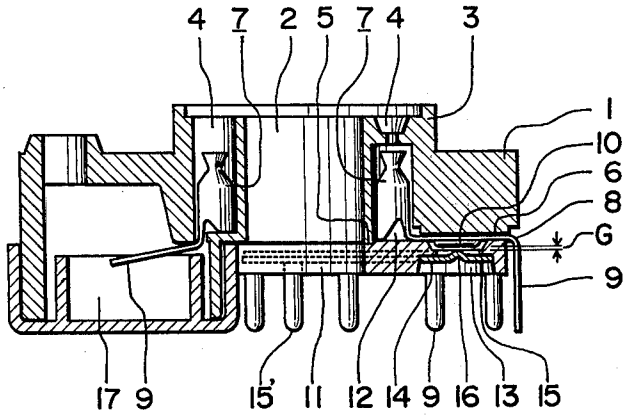


FIG. 2

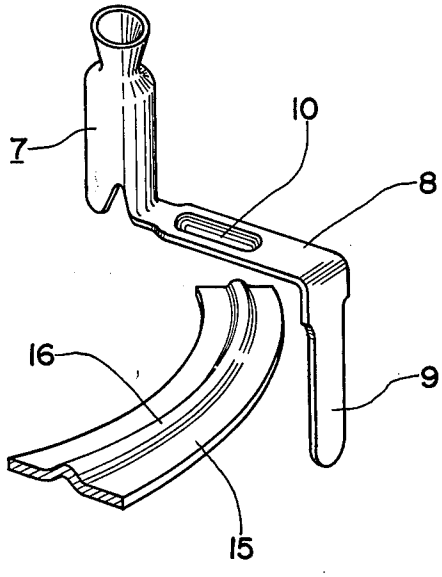


FIG. 3

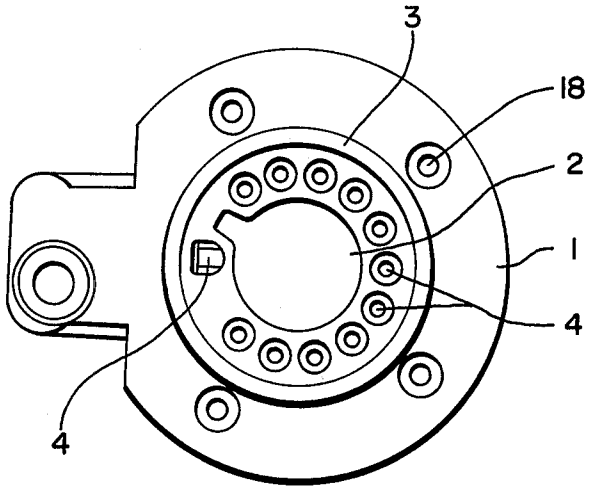


FIG. 4

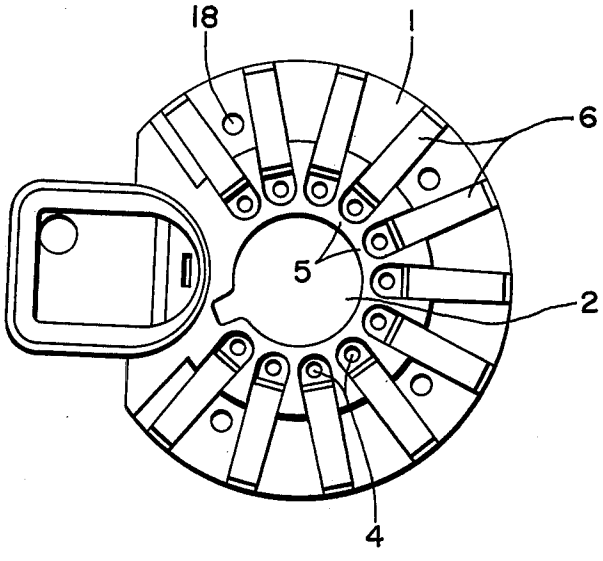


FIG. 5

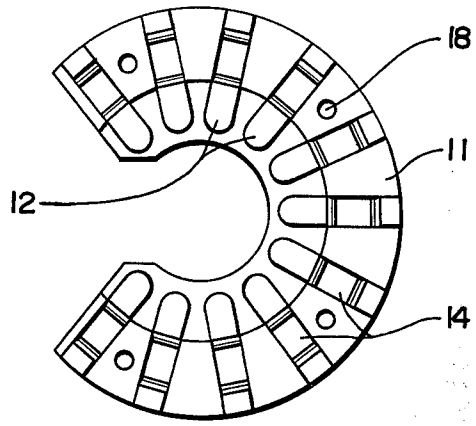
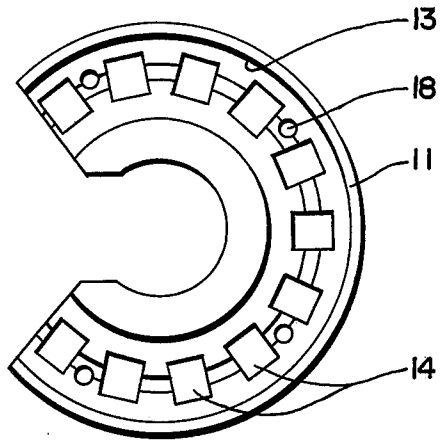


FIG. 6



ELECTRON TUBE SOCKET HAVING SPARK GAP STRUCTURE

BACKGROUND OF THE INVENTION

This invention relates to electron tube sockets and is particularly concerned with a socket provided with a spark gap to discharge abnormally high voltage when it appears.

In the hitherto known conventional electron tube socket of this type, a discharge device called an arrester is provided separately from the socket, which brings about a disadvantage that manufacturing cost becomes high and additional work is required in the assembling process.

A socket having an interior discharge portion has been already proposed, which is composed of an insulation base body having a plurality of radially extending flat conductor portions of terminal contacts and a grounding ring plate formed with the same number of projections as that of the conductor portions, each of the projections being positioned in opposition to or faced to each of respective conductor portions to thereby form arc-over gaps between the projections and the conductor portions. The socket of this construction has a drawback in that the centered relation positions between the conductor portions of contacts and the projections of the grounding plate may be disarraged, whereby difficulties are encountered with for obtaining spark gaps each having a predetermined gap dimension. Additionally, because the grounding plate is punched from a brass plate and therefore ears and edges are likely to be formed at the pointing portions of the projections, the voltage at which the discharge occurs may vary depending on the individual discharge portions.

An object of the present invention is to provide an improved socket from which all the above mentioned disadvantages are substantially eliminated.

Another object of the present invention is to provide an electron tube socket comprising a grounding plate and conductor portions of terminal contacts, both having respective protruding zones which are positioned so as to intersect each other to thereby form arc-over gaps therebetween.

The above and other objects as well as novel features and advantages of the invention will become more apparent from the following description of a preferred embodiment of the invention. The description makes reference to drawings.

Brief Description of Drawings

FIG. 1 shows a socket according to the invention in a vertical sectional view;

FIG. 2 is a partial perspective view of the socket to show the positional relationship between a conductor of a terminal contact and a grounding plate;

FIG. 3 is a top plan view of an insulation base body;

FIG. 4 is a bottom plan view of an insulation base body;

FIG. 5 is a top plan view of an insulation plate; and

FIG. 6 is a bottom plan view of the same.

Detailed Description of Preferred Embodiments

In the drawings, reference numeral 1 indicates an insulation base body having a guide through-hole 2 formed at the center portion thereof. The base body 1 further has an annular protrusion 3 integrally formed at the upper surface thereof. A plurality of pin inserting openings 4 are formed through the base portion along the inner circumference of the protrusion 3 with constant distances between the adjacent openings 4. Additionally, a corresponding number of radial grooves 6 are formed in the lower surface of the base body 1, which grooves 6 are insulated from the central guide hole 2 by thin walls 5 and opened in the outer peripheral surface of the base body 1.

Each of the grooves 6 are individually communicated with the associated pin inserting openings 4. Reference numeral 7 denotes a terminal contact, which has a conductor portion 8 extending flatly from the lower end of the contact 7 and an integral terminal portion 9 bent from the flat conductor portions 8, as is shown in FIG. 2. It is to be noted that the conductor portion 8 has a protrusion or protruding zone 10 formed at the lower surface and extending longitudinally. Reference numeral 11 indicates a circular insulation plate which has the same outer and inner diameters as the insulation base body 1 and is formed with ribs 12 at the upper surface thereof, which ribs 12 being adapted to engage the grooves 6. The insulation plate 11 has a concaved annular groove 13 formed at the lower surface, as is shown in FIGS. 1 and 6. A plurality of through-holes 14 are provided at the intersections of the grooves 6 and 13. Reference numeral 15 denotes a grounding plate which consists of an electrically conductive ring like plate, as is shown in FIG. 2, and has a protrusion 16 projecting upwards and integrally formed at the middle portion and a terminal 15' for connecting it to a grounding circuit.

One of the contacts 7 serves for the application of a high voltage such as for the connection of the focus terminal of a cathode ray tube, for example. A shield box 17 encasing the terminal portion 9 of the contact 7 for high voltage is formed by the insulation base body 1 and the plate 11.

The assembling of the socket according to the present invention can be carried out as follows:

At first, the contacts 7 are inserted into the pin inserting openings 4 from below with the conductor portions 8 being accommodated within the grooves 6. The grounding plate 15 is fitted into the concaved annular groove 13 of the insulation plate 11. Next, set screws (not shown) are inserted into the holes 18 extending through the insulation base body 1, plate 11 and grounding plate 15, and finally the assembly is held in a rigid construction by means of nuts (not shown) threaded onto the set screws.

As can be seen in the drawings, the grounding plate 15 is positioned away from the conductor portions of said terminal contacts with a raised protrusion formed thereon. The grounding plate is positioned so that the protrusion formed on each of the terminal contacts overlies the protrusion on the grounding plate and lie along an axis which intersects or crosses the protrusion on the grounding plate when viewed in plan. In this way, an arc gap is formed between the overlying points of each terminal contact protrusion and grounding plate protrusion at the point of intersection of the longitudinal axis in plan view of the protrusion on the terminal contact and the grounding plate.

By constructing the socket in the above described manner, arc-over gaps G having a predetermined gap dimension are formed between the protrusion 10 of the

conductor portions **8** of the contacts **7** and the protrusion **16** of the grounding plate **15.** When a potential difference beyond a predetermined value appears between the conductor portions **8** and the grounding plate **15,** the gaps are fired to discharge the overvoltage.

As is obvious from the foregoing description, in the electron tube socket according to the invention, the protrusions **16** and **10** are provided by an embossing work on the grounding plate **15** and the conductor portions **8** of contacts **7,** respectively, to thereby form arc-over gaps between the protrusions **16** and **10.** In other words, since the arc-over gaps are formed interiorly of the socket by assembling the grounding plate therein, the socket having the discharge portions or arresters can be manufactured compact and the number of the parts for the socket assembly can remarkably be reduced as compared with the conventional sockets. Further, even if disarrangement should occur in the positions of the grounding plate **15** and the contacts **7,** the arc-over gaps G formed by the protrusions **16** and **10** will remain unchanged. Neither ears nor edges can be produced at the pointing portions of the protrusions of grounding plate **15.** Those protrusions **16** and **10** can be easily formed by an embossing work or process.

Although the invention has been described and illustrated with reference to a preferred embodiment, it should be obvious for those skilled in the art that many modifications and variations may be made in the form of the invention without departing from the spirit and scope of the invention as defined in claims.

What is claimed is:

1. An electron tube socket comprising an insulation base body formed with a plurality of holes positioned peripherally and spaced from each other, a plurality of terminal contacts each having pin receiving portion inserted into one of said holes and having an integral conductor portion extending radially on the lower surface of said base body with a longitudinal protrusion formed along the conductor portion on the lower side thereof, a grounding plate positioned so as to be spaced from said conductor portions of said terminal contacts, and a protrusion integrally formed in said grounding plate through its entire length and positioned so that when viewed in plan the longitudinal axis of said protrusions on said conductor portions are seen to intersect the protrusion on said grounding plate at points of intersection to form arc-over gaps between said protrusions on said conductor portions and the protrusion on said grounding plate at said points of intersection.

2. An electron tube socket according to claim **1,** further comprising an insulation plate for pressing said conductor portions against said base body and positioning said grounding plate spaced from said conductor portions.

3. An electron tube socket according to claim **2,** wherein radial grooves are formed in said base body for fitting said conductor portions therein, and said insulation plate is formed with ribs fitted into said grooves.

4. An electron tube socket according to claim **2** wherein the longitudinal axis of the protrusions on said conductor portions are substantially perpendicular with said protrusion on said grounding plate at said point of intersection when viewed in plan.

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