

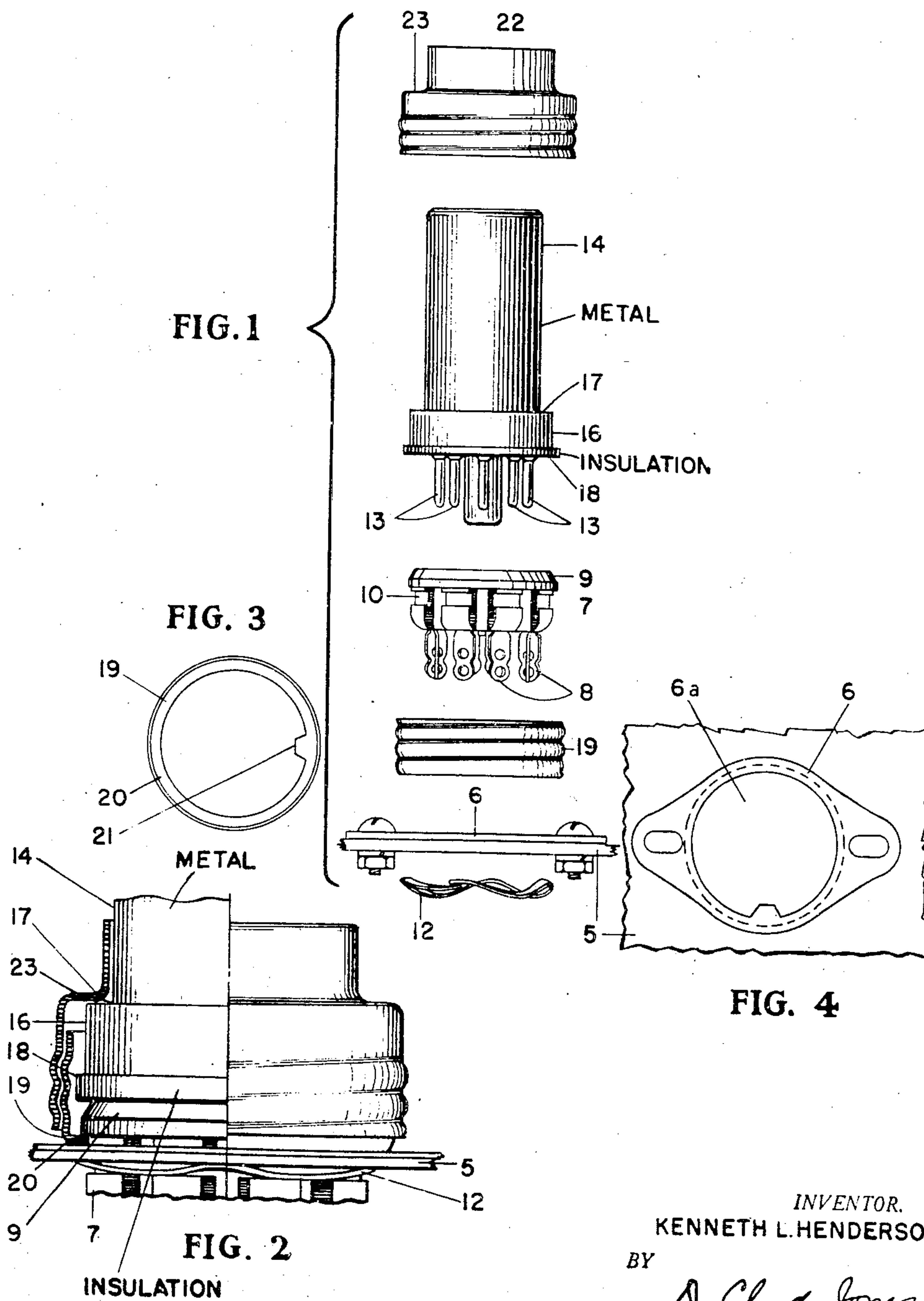
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K. L. HENDERSON

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ELECTRICAL SHIELDING AND LOCKING MEANS FOR THERMIONIC TUBES

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INVENTOR.
KENNETH L. HENDERSON
BY
A. Clyde Jones

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ELECTRICAL SHIELDING AND LOCKING
MEANS FOR THERMIONIC TUBES

Kenneth L. Henderson, Irondequoit, N. Y., assign-
or to Stromberg-Carlson Telephone Manufac-
turing Company, Rochester, N. Y., a corpora-
tion of New York

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This invention relates to electrical shields and more particularly to shields for thermionic tubes.

In signalling devices utilizing thermionic tubes and especially those devices intended to operate at ultra-high frequencies while subjected to rough usage or severe vibration, the thermionic tubes thereof must be adequately shielded and must also be securely retained against accidental displacement from their respective sockets. Such tubes, while in use, generate considerable heat and consequently there should be a minimum coverage of the radiating surfaces thereof by any shields used.

In accordance with the main feature of the present invention, there is provided means for electrically shielding a thermionic tube and for retaining said tube in a tube socket of a device in which it is used.

For a clearer understanding of the invention, reference is made to the drawing in which Fig. 1 is an exploded view of a portion of a support, as well as a tube socket and a thermionic tube together with tube shielding and locking means; Fig. 2 is a fragmentary elevational view of an assembly of the parts illustrated in Fig. 1; Fig. 3 is a plan view of the metal ring which forms a part of the shield; and Fig. 4 is a plan view of the socket plate and a fragment of the support to which it is attached.

In the drawing, the numeral 5 designates a sheet-metal support which may be the chassis of a signalling device. This support has an opening therein which is shown as covered by a socket plate 6, secured to the support. The socket plate is provided with an opening 6a in which a tube socket 7 is mounted with its contactors 8 extending downward. While the socket can be attached to the support in any convenient manner, it is preferred to provide the upper portion of the socket with a peripheral shoulder 9 of larger size than the opening in the support while the lower portion of the socket is of a size to pass through the mentioned opening. The intermediate portion of the socket is formed with a circumferential groove 10 therein near said shoulder, the groove being adapted to receive a split locking ring 12 of undulating form. It will be understood that in assembling the socket on the support, the lower portion of the socket is inserted in the opening in the support. Thereupon, the split ring is sprung into the groove where it bears against the lower surface of the support 5 to lock the socket in position, with its

shoulder 9 firmly engaging the upper surface of the support.

The top portion of the socket 7 is provided with openings adapted to receive the well-known contactors or plug terminals 13 of a thermionic tube into engagement with the socket contactors 8. This tube comprises a metal envelope 14 in the form of an inverted cup having an outwardly offset rim portion 16 with a shoulder 17. This rim portion of the envelope is closed by a relatively thick disc of insulating material 18 in which the mentioned tube contactors 13 are mounted.

Inasmuch as the metal of the tube envelope 14 and the metal of the support 5, together with the socket contactors 8, are separated by dielectric such as the insulating base 18 of the thermionic tube and the surrounding air, the internal elements of the tube and the internal leads connecting the socket contactors 8 thereto are not completely surrounded by metal. Consequently, the internal portions of the tube are only incompletely shielded from external electric and magnetic fields and conversely, externally located electrical circuits are only incompletely shielded from electric and magnetic fields existing within the tube. This electrical leakage results in very objectionable effects, especially at ultra high frequencies.

In order to obviate this leakage, there is provided in accordance with this invention, novel shielding means which also serves to lock the thermionic tube in its socket. This means includes a metal ring 19 secured to the upper surface of the support in a position to encircle said socket 7, the ring being slightly larger in diameter than the diameter of the offset rim portion 16 of the tube envelope 14 and its base. The ring at its lower edge is provided with an inwardly extending annular flange 20 of a size to lie between the upper surface of said socket plate and the under surface of the shoulder 9 on the socket so that the ring is detachably held in position on the support along with the socket. The annular flange 20 of the ring is provided with a lug 21 to engage a portion of the socket so that the ring is held against rotation.

The shielding and locking means also includes an annular member 22 having an inwardly offset portion provided with a shoulder 23 and generally conforming to the shape of the outwardly offset portion 16 of the tube envelope 14. It will be noted that the member 22 extends only for a limited distance beyond the shoulder 17 of the

tube envelope, so that the upper or radiating surface of the envelope is left uncovered. The lower portion of the annular member 22 telescopically engages the projecting portion of the ring 19 in which position these parts are retained by inter-engagement thereof, such as by screw threads formed in these parts. During use, the annular member 22 is screwed on to the ring 19 until the shoulder 23 on the member by contacting the shoulder 17 on the tube, forces the tube against the socket.

By this construction, shielding parts extend from the metal tube envelope 14 to the metal support 5 so that the possibility of electrical leakage is reduced to a negligible amount. At the same time, the tube is locked in its socket and yet the major portion of the radiating surface of the tube is left uncovered.

What I claim is:

1. The combination with a metal support having thereon a socket provided with contactors, and a thermionic tube of the type comprising a cup-shaped metal envelope provided with an offset rim portion as well as a base joined to said rim portion, said base including insulating material with contactors mounted thereon to engage said socket and said socket contactors, of a metal ring secured at one of its edges in contacting relation with said support to project from a position on said support where it encircles the base of said tube mounted in said socket, and an annular metal member having an inwardly offset portion

conforming to the offset rim portion of said envelope, said member being provided with means interlocking it in telescopic relation with said ring and with said tube rim portion firmly engaged by said inwardly offset portion of said member whereby said tube is retained in said socket and whereby electrical leakage at the juncture of said tube base with said support, is obviated.

2. The combination with a metal support having thereon a socket provided with contactors and a thermionic tube of the type comprising a cup-shaped metal envelope provided with an outwardly extending shoulder adjacent its rim as well as a base joined to said rim, said base including insulating material with contactors mounted thereon to engage said socket and said socket contactors, of a metal ring secured at one of its edges in contacting relation with said support to project from a position on said support where it encircles the base of the tube mounted in said socket, and an annular metal member conforming to the rim portion of said envelope and having an inwardly extending shoulder, said ring and said member being provided with inter-engaging screw threads for adjusting said member until the shoulder on the ring firmly engages the shoulder on said envelope whereby said tube is retained in said socket and whereby electrical leakage at the juncture of said tube base with said support, is obviated.

KENNETH L. HENDERSON.