United States Patent

Owens et al.

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[54] KINESCOPE SOCKET

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[73] Assignee: **RCA Corporation**

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[21] Appl. No.: **101,357**

[52] **U.S. Cl.** .....**317/61.5**, 339/194 R

[51] **Int. Cl.** **H02h 1/04**

[58] **Field of Search** .....339/143 T, 194 R; 313/325, 313/331; 317/61, 61.5

[56] **References Cited**

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Assistant Examiner—Harvey Fendelman
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[57] **ABSTRACT**

A kinescope socket includes two sections secured together by conductive connectors, with keyhole openings in each of the sections in alignment. A portion of each conductive connector is held captive within one of a plurality of kinescope pin receptacles in the first section. The other section has a conductive pattern on one of its surfaces. The pattern includes conductive pads electrically connected to pins of a kinescope when inserted into the kinescope pin receptacles by a second portion of the conductive connector. The second portion passes through the two sections and is connected by a conductive strap to the first portion. The conductive pattern also includes a conductive area adjacent to, but separated from, the conductive pads to provide an arc gap therebetween.

15 Claims, 8 Drawing Figures

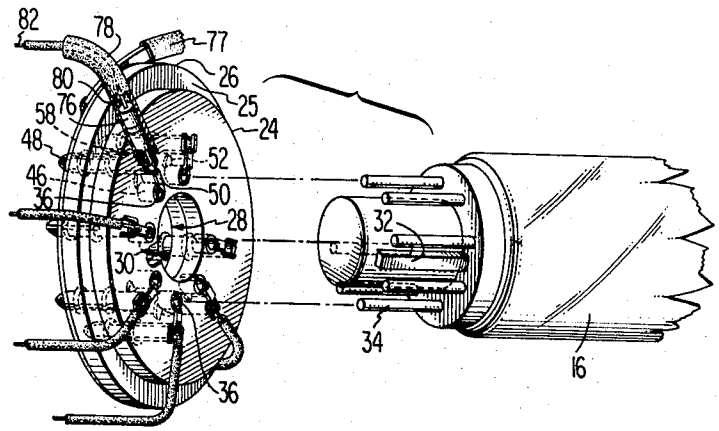
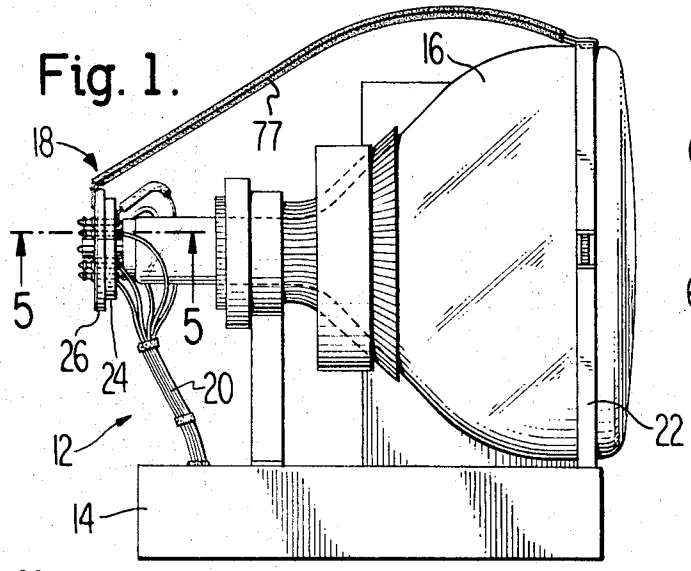


Fig. 1.



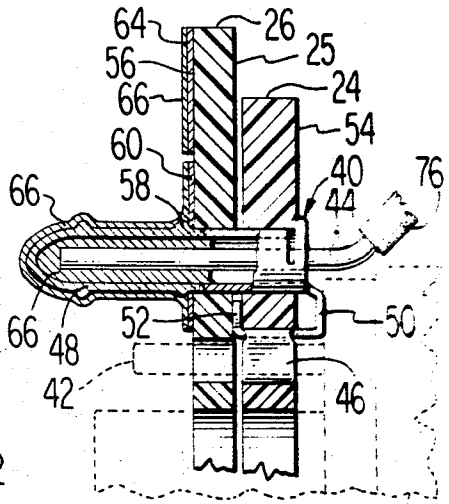


Fig. 5.

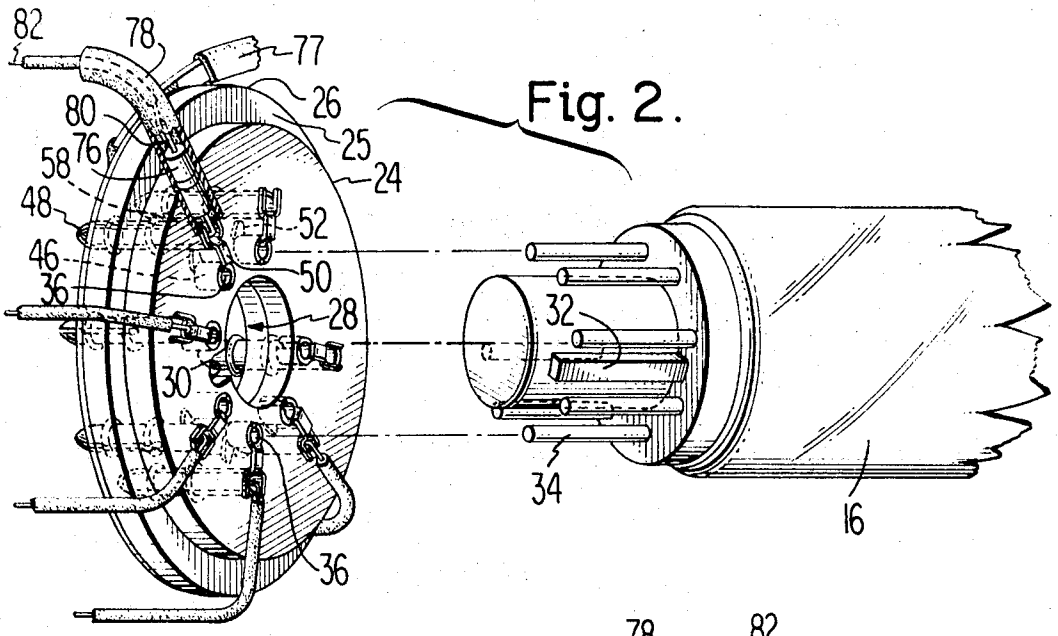


Fig. 2.

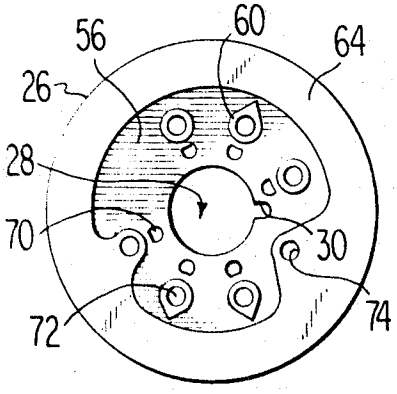


Fig. 4.

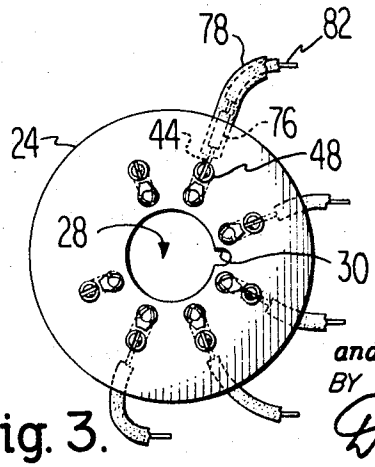


Fig. 3.

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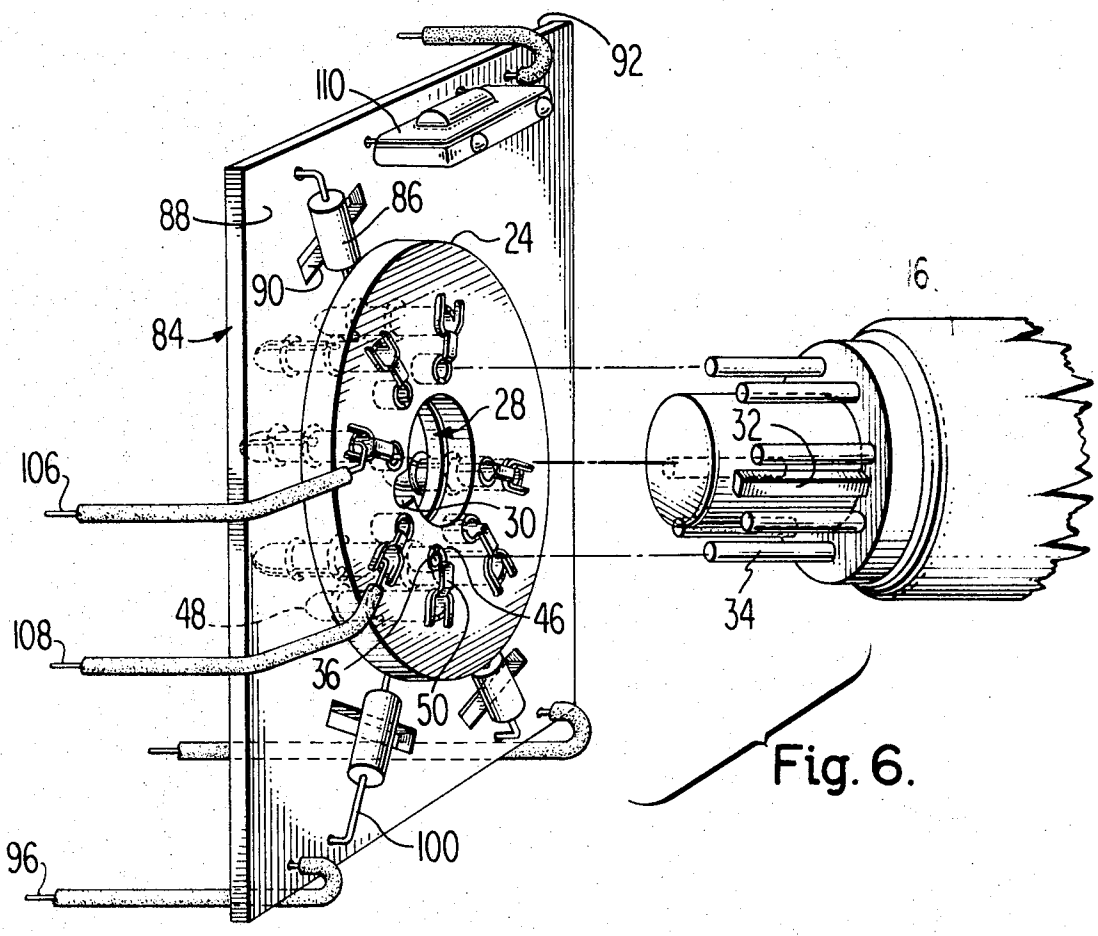

Fig. 6.

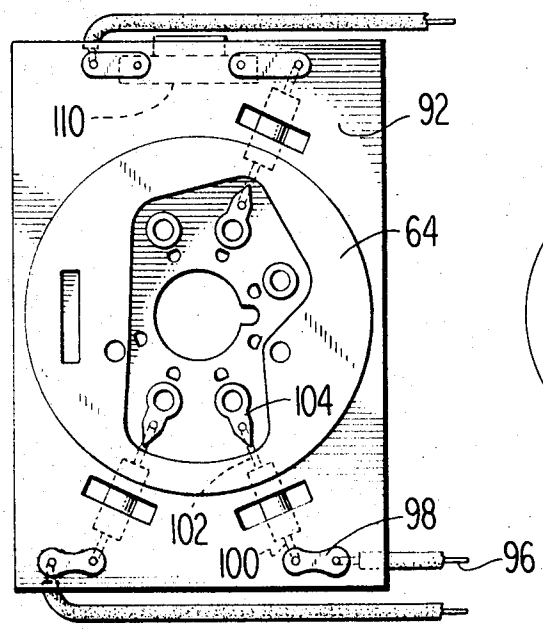

Fig. 8.

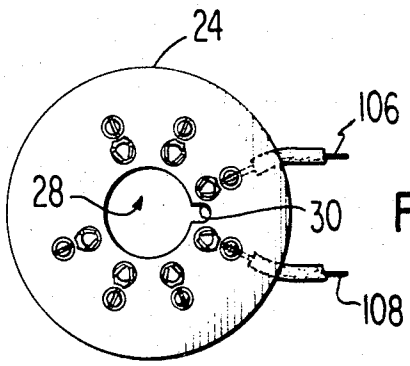

Fig. 7.

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KINESCOPE SOCKET

The present invention pertains to kinescope sockets and more particularly to kinescope sockets of the type which include spark gaps.

Operating conditions within kinescopes occasionally cause arcing across high voltage components within the tube. The current resulting from the arcing, where no protection is afforded, can be conducted through the kinescope socket terminals and lead wires to other components connected to the kinescope. Consequently, spark gaps are often connected to the kinescope pins to provide an alternate low impedance path to divert the current associated with the high voltage away from the components. These spark gaps have been located either on the chassis itself or in the kinescope socket itself.

Known kinescope sockets which include spark gaps consist of several components which must be assembled and are, thus, costly to manufacture. This is particularly undesirable where the kinescope socket is used in a television receiver because of the competitive nature of mass-produced consumer electronics products.

It is the object of the present invention to provide a television receiver kinescope socket which includes spark gaps and is low in cost and simple in construction.

In accordance with the present invention, a kinescope socket includes two sections, each having a keyhole aperture. One section has a plurality of kinescope pin receptacles, and the second section has a conductive pattern on one of its surfaces. The pattern includes conductive pads adapted to be connected to the pins of a kinescope inserted within the pin receptacles and a conductive area adjacent to and separated from the conductive pads to form an arc gap therebetween. Means secure the two sections together with both keyhole apertures in alignment.

A complete understanding of the present invention may be obtained from the following detailed description of a specific embodiment thereof, when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a side elevation view of a television receiver chassis and kinescope connected by means of a kinescope socket embodying the present invention;

FIG. 2 is a partial exploded perspective view of the kinescope and kinescope socket shown in FIG. 1;

FIG. 3 is a left side view of the first section of the kinescope socket of FIG. 2;

FIG. 4 is a left side view of a second section of the kinescope socket of FIG. 2 showing the conductive printed circuit pattern;

FIG. 5 is a partial section view of the kinescope socket taken along the lines 5—5 in FIG. 1 to show certain details in construction of the socket connectors with the mating portions of the kinescope shown in phantom;

FIG. 6 is a partial exploded perspective view of an alternate embodiment of the kinescope socket shown in FIG. 1 wherein the circuit components of the television receiver are mounted on the socket second section;

FIG. 7 is a left side view of the first section of the kinescope socket of FIG. 6; and

FIG. 8 is a left side view of the second section of the kinescope socket of FIG. 6 showing the conductive printed circuit pattern.

For the sake of clarity, the reference numerals are applied, in the several FIGURES, where a plurality of identical socket structures are shown, to only one or a few of the identical structures. Referring now to FIGS. 1–5 generally, a television receiver 12 includes a chassis 14, such as the KCS–184 shown in RCA Service Data File 1970 No. T13, having the television signal processing and deflection generating circuitry. A television receiver kinescope 16, such as the 19VAJP4 shown in the Service Data, is electrically connected to the chassis 14 by means of a kinescope socket assembly 18 and the wires of a wiring harness 20. The kinescope 16 is physically secured to the chassis 14 by a kinescope mount 22 which is electrically connected to the chassis ground or reference potential. The

Service Data may be obtained from RCA Corporation, 600 North Sherman Drive, Indianapolis, Indiana 46206.

The socket 18 includes a first section 24 and a second section 26 which are fabricated from an electrical insulating material such as phenolic. The sections 24 and 26 are axially aligned and include a central aperture 28 with a keyhole slot 30. The keyhole slot 30 cooperates with the kinescope key 32 to align the kinescope pins 34 with the kinescope pin receiving holes 36. Each of the pin receiving holes is formed as part of an electrical conductive connector which serves several purposes. Firstly, the conductive connectors receive and are electrically connected to the pins 34 of the television receiver kinescope 16. The conductive connectors also physically secure the sections 24 and 26 together. Additionally, the conductive connectors provide a convenient physical support and electrical connection for the wires of the wiring harness 20. Finally, the conductive connectors electrically couple the kinescope pins 34 to the protective spark gaps.

Reference is now made to FIG. 5 which shows the detailed construction of a connector 40 receiving a kinescope pin 42 which is shown in phantom and a wire 44. The connector 40 includes two main portions, a circular portion 46 which is the female receptacle for the kinescope pin 42 and an elongated tubular portion 48. These portions are connected by a conductive strap 50 and are secured to the kinescope socket section 24 by means of a tab 52. The elongated tubular portion 48 extends from the surface 54 of the section 24 through the sections 24 and 26 to a point beyond the surface 56 of the section 26. The tubular portion 48 has a flange 58 which engages a copper conductive printed circuit pad 60 on the surface 56. Because of the dimensions, the flange 58 biases the sections 24 and 26 toward each other; however, the sections are maintained in a slightly separated position by virtue of the tab 52.

The conductive pad 60, as is best shown in FIG. 4, is positioned on the section 26 adjacent to, but not touching, a printed circuit conductive ring 64 which is on the surface 56 of the section 26. The elongated tubular portion 48 mates with and is the female receptacle for the wires 44 of the wiring harness 20. The wire 44 is secured in the tubular portion 48 by virtue of solder 66 which fills a portion of the space within the tubular portion 48 around the wire 44. The solder flows into the tubular portion 48 to electrically connect the tubular portion to the wire 44, as shown in FIG. 2, because the tubular portion is slotted. It should be noted that during fabrication, the socket 18 section surface 56 is passed through a solder bath at which time a solder coating adheres to all the conductive portions of the socket and lock the sections 24 and 26 together. Thus, the entire exterior of the tubular portion 48 is covered or coated with the solder 66 which also extends onto and covers the conductive printed circuit pad 60 and ring 64. Similarly, the entire conductive printed circuit pattern is coated with the solder 66. Because the conductive connector portion 46 does not extend beyond the surface 25 of section 26, the solder from the solder bath does not flow into the pin receiving holes 36 which could obstruct the insertion of the kinescope pins. Thus, the socket 18 is particularly suitable for mass production techniques.

Referring now to FIG. 4 which shows a printed circuit pattern on the surface 56 of the section 26, at the center of the section is the aperture 28 with the keyhole slot 30. Concentric to the aperture 28 are a series of smaller apertures 70 which receive the circular portion 46 of a connector. Adjacent to the apertures 70 and concentric with the aperture 28 are another series of apertures 72. A conductive printed circuit pad surrounds each of the apertures 72. An aperture 74 is provided within the conductive printed circuit ring 64 so that the ring can be electrically connected to ground via one of the wires of the wiring harness 20. Additionally, the conductive printed circuit ring 64 is connected to ground by a heavy conductive strap 77 (FIG. 1) connected to the kinescope mount 22. Certain ones of the conductive printed circuit pads which are associated with pins of the kinescope which are particularly subject to arcing, have a heart shaped form with the apex pointed

toward the conductive ring **64**. Whenever a high voltage of sufficient magnitude occurs, arcing will take place from the apex of the printed circuit pad to the conductive ring which is grounded.

In certain applications, it may be desirable to have isolating resistors in series with the wires of the wiring harness **20**. In such case, as shown in FIG. **2**, a resistor **76** which is encased in an insulative tubular member **78** has one of its wires or leads **44** inserted into and soldered in the tubular portion of the connector (FIG. **5**). The other wire or lead **80** of the resistor **76** is soldered to one of the wires **82** of the wiring harness **20**. It should be noted that several connectors are shown which do not have wires attached to them. This is for the sake of clarity to permit a clearer understanding of the construction of the connector.

Referring now to FIGS. **6–8** where similar reference numerals designate similar components shown in FIGS. **1–5**, the first section **24** can be used in conjunction with another second section **84** which is substantially larger than the section **26**. The section **84** is of sufficient size to permit mounting chassis circuit components. Thus, isolation resistors **86** which are electrically connected in series with certain of the leads of the wiring harness **20** are mounted on the section **84**. The resistors are mounted with the resistor body resting on the surface **88** of the section **84** over a slot **90**. The slot is provided to increase the dielectric between the ends of the resistor **86** to inhibit arcing across the resistor.

As is shown in FIG. **8**, the leads of the resistors **86** pass through the section **84** and emerge in conductive printed circuit pads on the surface **92** of the section **84**. Where this occurs, to provide room for the connection of the resistor lead, the conductive pad may be elongated to permit the connection at a point away from the apex of the conductive pad which is adjacent to, but separated from, the conductive ring **64**. In those instances where an isolating resistor is mounted on the conductive pattern, the wire of the wiring harness is not directly connected to the connector **40** but to a conductive printed circuit pattern on the surface **92** of the section **84**. For example, the wire **96** of the wiring harness **20** is electrically connected to a conductive pattern **98** on the surface **92**. One of the leads **100** of a resistor **86** is also connected to the conductive pattern **98**. The other resistor lead **102** is connected to the conductive pad **104** at a point away from the apex of the pattern. The conductive pad, similar to the socket shown in FIGS. **1–5**, is connected to the tubular portion **48** of the connector which is electrically coupled via the strap **50** and the circular portion **46** to the mating pin of the kinescope. Because the conductive portion **46** does not extend beyond the socket section **24**, during fabrication, the solder from the solder bath will not flow into the pin receiving holes **36** which could obstruct the insertion of the kinescope pins. The sections **24** and **84** are locked together by the solder which coats all exposed conductive areas on surface **92** of section **84**.

In those cases where an isolating resistor is not required, the wire can be connected in a manner similar to that described in connection with FIG. **5**. Thus, the wires **106** and **108** of the wiring harness **20** are inserted into and soldered in the tubular portion **48** of the connector **40**. It should be noted that where desirable a decoupling inductor such as inductor **110** may be mounted on the socket section **24** and electrically connected in a manner similar to the isolating resistors **86**.

What is claimed is:

1. A kinescope socket comprising: a first section having a keyhole aperture and a plurality of kinescope pin receiving openings; a section section having a conductive printed circuit pattern on one of its surfaces and a keyhole aperture, said conductive printed circuit pattern including conductive pads adapted to be electrically connected to the pins of a kinescope inserted into said pin receptacles and a conductive area adjacent to and separated from said conductive pads to provide an arc gap therebetween; and means securing said first section keyhole aperture and said second section keyhole aperture in alignment.

2. A kinescope socket comprising: a first section having a keyhole aperture and a plurality of kinescope pin openings; a second section having a conductive pattern on one of its surfaces and a keyhole aperture, said conductive pattern including conductive pads adapted to be electrically connected to the pins of a kinescope inserted into said pin receptacles and a conductive area adjacent to and separated from said conductive pads to provide an arc gap therebetween; and means securing said first section keyhole aperture and said second section keyhole aperture in alignment, said means for securing including conductive connectors having a first portion which mates with the pins of said kinescope, a part of said first portion held captive within said first section pin receiving opening, and a second portion mounted to pass through said first section and electrically connected to the conductive pattern on said section section.

3. A kinescope socket as defined in claim **1** wherein all the exposed conductive parts of said socket on said conductive pattern side of said second section are coated with a layer of conductive material.

4. A kinescope socket as defined in claim **2** wherein the second portion of said conductive connectors project beyond the conductive pattern side of said second section, and are coated with said conductive material such that said first and said second section are locked together.

5. A kinescope socket as defined in claim **4** wherein said conductive material is solder.

6. A kinescope socket as defined in claim **2** including a plurality of wires, each wire coupled to one of said conductive connectors.

7. A kinescope socket as defined in claim **6** wherein said wires are coupled to said connector second portion.

8. A kinescope socket as defined in claim **3** including electric components mounted on said second section and electrically connected to the conductive pattern on said second section by said conductive material.

9. A kinescope socket as defined in claim **8** wherein said electric components are connected in series with a wire connected to signal processing circuits remote from said kinescope socket.

10. A kinescope socket as defined in claim **9** wherein said electric components are isolating resistors.

11. A kinescope socket as defined in claim **9** wherein said electric components are isolating inductors.

12. In a kinescope socket having spaced kinescope pin receiving contact terminal means therein to receive the terminal pins of a kinescope, a structure comprising: a conductive printed circuit pattern mounted on a single insulating socket member, said pattern including a plurality of conductive pads electrically connected to the pins of said kinescope; a conductive area adjacent to and spaced apart from said conductive pads; said conductive area electrically connected to a fixed reference potential; and said conductive pads and conductive area cooperating to form an arc gap.

13. A structure as defined in claim **12** wherein said insulating socket member includes a keyhole aperture adapted to cooperate with a key on said kinescope, and said plurality of conductive pads are positioned on said insulative member substantially concentric with said aperture.

14. A structure as defined in claim **13** including a second insulating socket member having a keyhole aperture aligned with said first insulating socket member keyhole aperture; and said spaced kinescope pin receiving contact terminal means mounted to said second insulating socket member.

15. A structure as defined in claim **13** wherein said conductive area is disposed on said first insulating socket member to encircle said keyhole aperture and said plurality of conductive pads.

* * * * *

Disclaimer

3,668,475.—*Raymond Clyde Owens*, Carmel, and *Lucius Ponder Thomas*, Indianapolis, Ind. KINESCOPE SOCKET. Patent dated June 6, 1972. Disclaimer filed Sept. 23, 1976, by the assignee, *RCA Corporation.*

Hereby enters this disclaimer to claims 12, 13 and 15 of said patent.

[*Official Gazette November 23, 1976.*]

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