

[54] **HEATER FOR FAST WARMUP CATHODE** 3,495,121 2/1970 Katz..... 313/337 X
 3,553,521 1/1971 Bakker et al. 313/337
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 [58] Field of Search 313/337, 341, 346, 270, 313/271

[56] **References Cited**

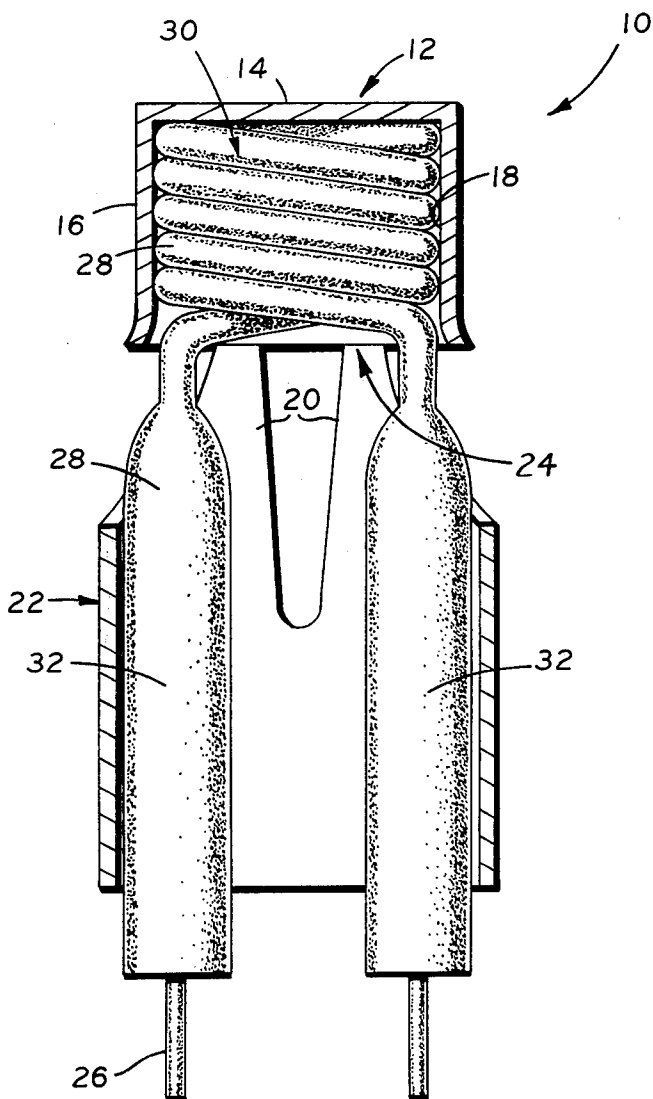
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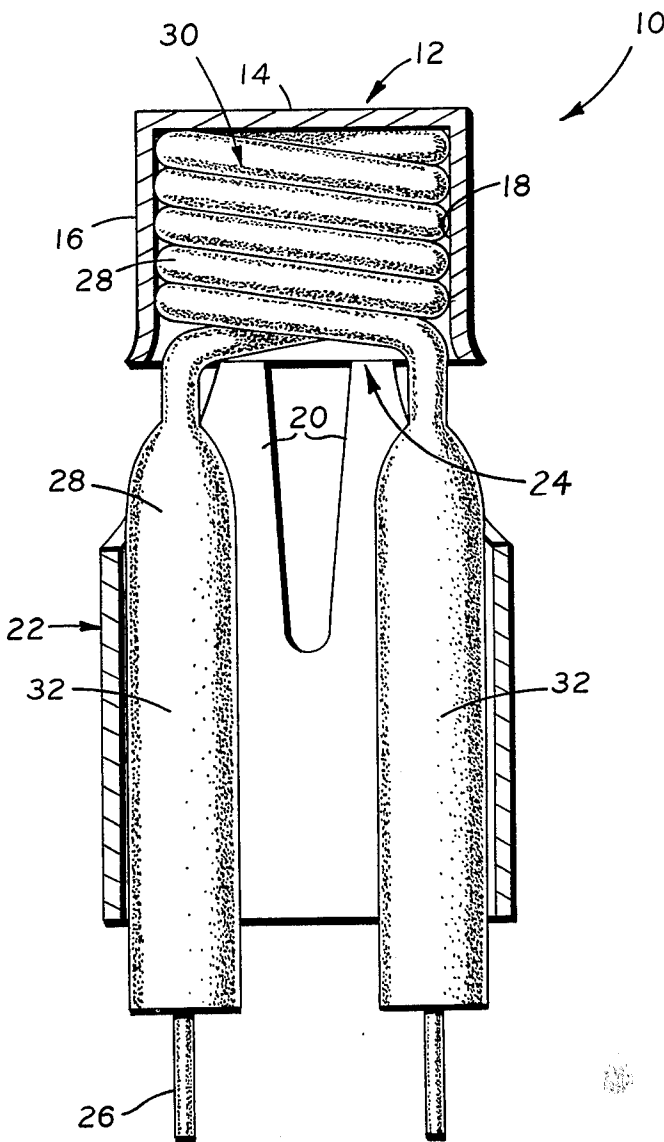
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[57] **ABSTRACT**

Heat loss from a fast warmup cathode heater is minimized by keeping the coiled body portion of the heater small in relation to the length of the heater legs and by increasing the thickness of the insulating coating on the legs by a factor of about 400% over that on the coils.

2 Claims, 1 Drawing Figure





HEATER FOR FAST WARMUP CATHODE

BACKGROUND OF THE INVENTION

This invention relates to heaters for fast warmup cathodes and more particularly to heaters for use in the cathodes of television picture tubes.

In the past many types of fast warmup cathodes have been proposed; however, most have not been commercially acceptable because of high failure rates or prohibitive costs. To accomplish the same result many manufacturers of television receivers have adopted a so-called "instant on" feature which provides heater current to all of the tubes in the receiver even if it is "off". While this system is very successful in accomplishing its purpose, it is very wasteful of electrical energy.

To rectify the energy waste, attention has again turned to providing a fast warmup cathode; that is, a cathode which will reach operating temperature and provide a viewable picture on the screen of a cathode ray tube in the neighborhood of 5 seconds. Such a cathode has recently been developed and is shown and described in U.S. patent application Ser. No. 409,041, assigned to the assignee of the present invention, the disclosure of which is herein incorporated by reference.

Such a cathode comprises basically a cup-shaped cap having electron emissive material on the closed end thereof and a cathode stack which is attached to the cap, by low heat conducting ribbons. This structure works extremely well for its designed purpose but could be improved even further if heat loss could be minimized from the heater encompassed therewithin.

OBJECTS AND SUMMARY OF THE INVENTION

It is, therefore, an object of this invention to obviate the disadvantage of the prior art.

It is another object of the invention to enhance heater operation in fast warmup cathodes.

Still another object of the invention is the provision of a heater for a fast warmup cathode which has minimized heat loss.

These objects are accomplished in one aspect of the invention by a heater which comprises an electrically conductive core substantially covered by an electrically insulating material. The heater is formed to provide a coiled body portion with a pair of extending legs. The height of the coiled body portion is small compared to the legs and to minimize heat loss from the legs the thickness of the insulating material thereon is substantially greater than that of the coiled body portion.

BRIEF DESCRIPTION OF THE DRAWINGS

The single FIGURE is a cross-sectional elevational view of a heater constructed in accordance with the invention mounted within a suitable cathode.

DESCRIPTION OF THE PREFERRED EMBODIMENT

For a better understanding of the present invention together with other and further objects, advantages and capabilities thereof, reference is made to the following disclosure and appended claims in connection with the above-described drawing.

Referring now to the drawing with greater particularity there is shown a fast warmup cathode 10 comprising a top cap 12 which is substantially cup shaped and includes a closed end 14 having a peripheral side wall 16 defining a hollow interior 18.

Top cap 12 is supported by a plurality of minimum contact areas 20 formed as part of a hollow cathode sleeve 22.

A heater 24 having an electrically conductive core 26 of a suitable material such as tungsten or molybdenum, surrounded by an electrically insulating coating 28, of a suitable material, such as alumina is positioned within the cathode 10. The heater 24 is formed to provide a coiled body portion 30, which is of small height compared with the height of the heater, which body portion is encompassed within the hollow interior 18 of top cap 12. A pair of legs 32 extend from body 30 through sleeve 22. To minimize heat loss from the extended pair of legs 32 the electrically insulating coating thereon is of much greater thickness than the coating on coiled body portion 30. To be effective the leg coating should be at least 300% and preferably 400% thicker than that on body portion 30. The terminal ends of legs 32 are left bare of insulation so that electrical connection can be made thereto.

In actual tests a heater having a coiled body portion coating thickness of 0.0017 inch and a leg coating thickness of 0.0068 inch showed a 5% improvement in warmup time compared with a heater having a uniform coating of 0.0017 inch. Such a reduction is indeed significant in an area where warmup time reduction is measured in hundredths of a second.

While there have been shown what are the preferred embodiments of the invention, it will be apparent to those skilled in the art that various changes and modifications can be made herein without departing from the scope of invention as defined by the appended claims.

What is claimed is:

1. A heater for a fast warmup cathode comprising: a metallic, electrically conductive core; and an electrically insulating coating surrounding said core; said heater being formed to provide a coiled body having a pair of legs extending therefrom, the height of said coiled body being small compared with the length of said legs; the insulating coating on said pair of legs having a thickness about 400% greater than the thickness of the insulating coating on the coils of said coiled body portion.

2. The heater of claim 1 wherein said insulating coating is alumina.

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