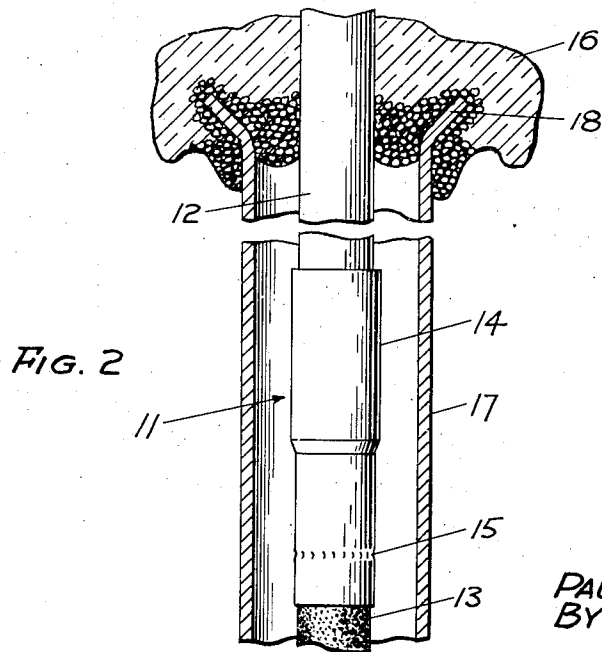
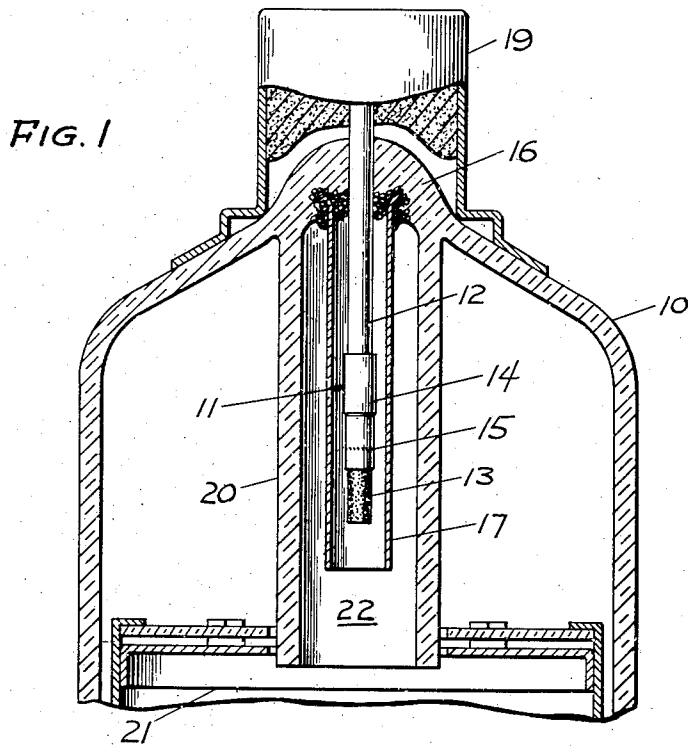


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P. W. STUTSMAN
GASEOUS DISCHARGE DEVICE

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GASEOUS DISCHARGE DEVICE

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4 Claims. (Cl. 250—27.5)

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This invention relates to space discharge devices and more particularly to means for supporting electrodes therein.

The main object of the present invention is to provide means for supporting electrodes in a vitreous body positioned within a device of the type above described, in a manner which will overcome any tendency for strains to develop in the vitreous to metal bonds where there exists a difference in the coefficient of expansion between said materials.

Another object is to provide means for properly anchoring carbon to metal in electrode construction that will insure a rigidly integrated unit.

The above and other objects will present themselves as the description of the present invention progresses and by reference to the accompanying drawing in which:

Fig. 1 is a partial view in cross section of a space discharge device embodying the present invention; and

Fig. 2 is a magnified view disclosing more clearly the illustrative embodiment of the present invention.

Referring now, more particularly to Fig. 1, the reference numeral 10 illustrates a portion of a vitreous envelope containing a rod-like anode structure 11 including an electrically conductive lead-in member 12, an anode 13, preferably a carbon rod, and an electrically conductive sleeve 14 surrounding portions of said members 12 and 13 in such a manner as to form said rod-like anode structure.

That portion of the conductive sleeve 14 surrounding the member 12 may be, and preferably is, secured to said member 12 by welding while the other portion of said conductive sleeve 14 is secured to the anode 13 by crimping said conductive sleeve 14 around the circumference 15 thereof in such a manner that it becomes substantially impossible to dislodge said anode 13. The foregoing manner of securing the anode within the sleeve 14, in contradistinction to the practice of providing a slidable fit and depending on friction to retain the anode in place, has proven its value when used in conjunction with electron discharge devices of the type described and claimed in a copending application of Paul W. Stutsman, Serial No. 647,463, filed February 14, 1946 now Patent No. 2,435,286.

In the above-mentioned application, the anode employed may be, for example, of the order of .050 inch thick. Thus, for example, when space discharge devices utilizing such diminutive anodes subject said anodes to voltages of the order of

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1000 volts and higher in conjunction, by way of illustration, with rectifying circuits, in a very short time said anodes become dislodged and materially depreciate the life span of the device utilizing same. Therefore, the manner of securing such anodes, as described herein, overcomes this undesirable condition and provides longer operating life for devices utilizing the illustrative embodiment of the present invention.

In the present embodiment the lead-in member 12 has its opposite end embedded in a vitreous body 16 which is integral with the envelope 10. Said opposite end continues on through the glass body 16 and is suitably secured to a conductive cap 19. An electrically conductive anode shield 17 is also embedded in said vitreous body and surrounds said anode structure 11, the space intermediate the anode shield 17 and said anode structure being sufficiently short to prevent the occurrence of a discharge therethrough. The end 18 of said conductive anode shield is flared outwardly. This particular feature permits the vitreous body 16 to flow more readily in the space intermediate the lead-in member 12 and said anode shield and thereby provides more substantial anchoring of the anode shield in said vitreous body.

Surrounding the conductive shield member 17 is a vitreous sleeve 20, one end of which is made integral with the vitreous body 16 of the envelope 10. The free end of said sleeve 20 projects slightly into a hollow cathode 21. Space 22 is provided within the free end of said sleeve 20 for the formation of a positive ion space charge in accordance with the description in the above-mentioned pending application of Paul W. Stutsman.

In Fig. 2 the greatly magnified view of the anode structure 11, the anode shield 17 and the vitreous body 16 clearly illustrates the manner in which the aforementioned elements are supported. One of the features, which it is desired to emphasize, is the formation of myriads of minute cells, having substantially flexible walls in the vitreous body adjacent said lead-in member 12 and the flared end 18 of the anode shield. By deliberately using a material for the anode shield which is non-wetting and gassy, as, for example, nickel, the area of said vitreous body 16 adjacent said anode shield 17 is caused to form aforesaid cells when the vitreous body is fused to said anode shield. The result of such cellular formation is a substantially flexible seal between said anode shield 17 and the vitreous body 16 that is capable of withstanding strains due to any difference in the coefficients of expansion between

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the materials of said vitreous body and anode shield.

The embodiment of the present invention which has been illustrated and described has been selected for the purpose of setting forth the principles involved. It will be obvious, however, that the invention may be modified to meet various conditions which may be encountered in different specific uses, and it is, therefore, intended to cover by the appended claims all such modifications which fall within the spirit and scope of this invention.

What is claimed is:

1. An electrical space discharge device comprising: an envelope including a vitreous body; and a conducting member disposed in said envelope and supported in but not passing through said vitreous body; said vitreous body including a multiplicity of gas cells limited to the vicinity of the support of said conducting member.

2. An electrical space discharge device comprising: an envelope including a vitreous body; and a conducting member, made of a gas-releasing and non-wettable material, disposed in said envelope and supported in but not passing through said vitreous body; said vitreous body including a multiplicity of gas cells limited to the vicinity of the support of said conducting member.

3. An electrical space discharge device com-

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prising: an envelope including a vitreous body; an electrode disposed in said envelope and sealed through said vitreous body; and a shield spaced from and surrounding said electrode and having one end thereof supported in but not passing through said vitreous body; said vitreous body including a multiplicity of gas cells limited to the vicinity of the support of said shield.

4. An electrical space discharge device comprising: an envelope including a vitreous body; an electrode disposed in said envelope and sealed through said vitreous body; and a shield being made of nickel and spaced from and surrounding said electrode and having one end thereof supported in but not passing through said vitreous body; said vitreous body including a multiplicity of gas cells limited to the vicinity of the support of said shield.

PAUL W. STUTSMAN.

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