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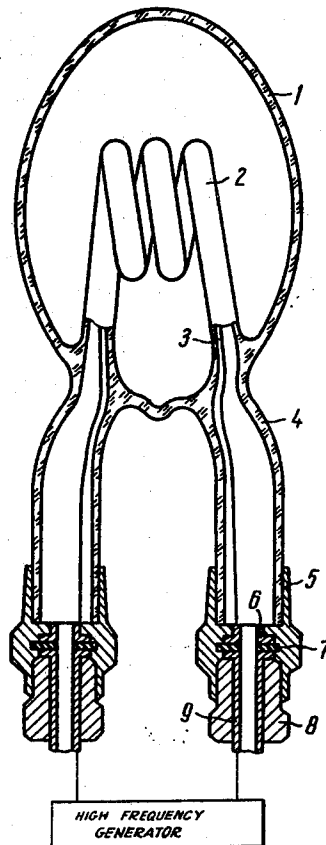
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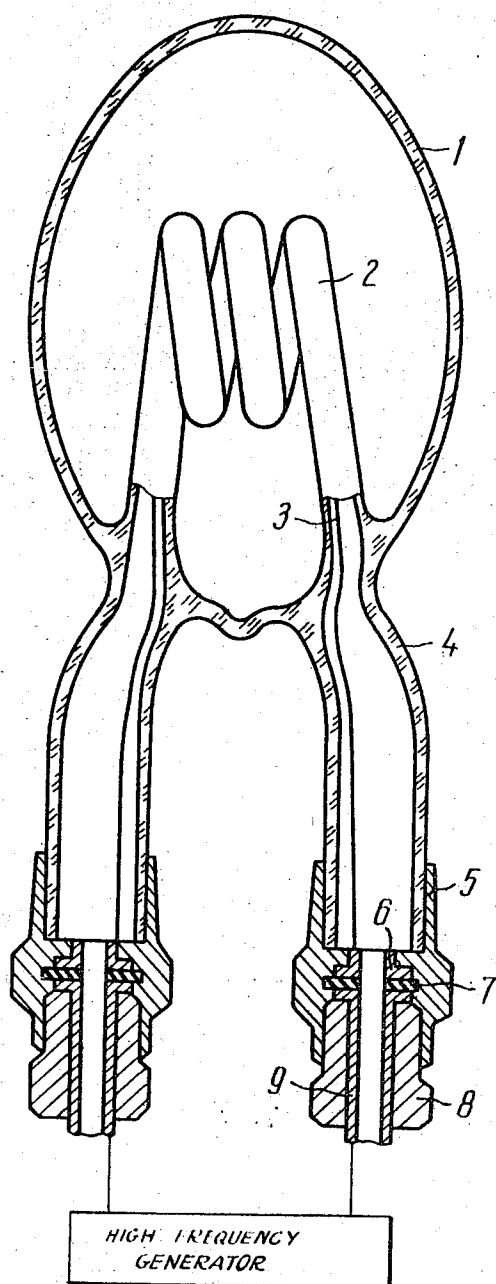
[54] **ELECTRODELESS HIGH-FREQUENCY LIGHT**
SOURCE
 2 Claims, 1 Drawing Fig.

[52] U.S. Cl..... **315/248,**
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 H01j 11/02; H05h 41/24

ABSTRACT: An electrodeless high-frequency light source, wherein a field coil which is essentially a solenoid supplied from a high-frequency generator, is enclosed throughout its length into an envelope and is displaced within a bulb filled with operating gas; the ends of the insulation envelope are led out from the bulb to supply coolant into the envelope.





ELECTRODELESS HIGH-FREQUENCY LIGHT SOURCE

The present invention relates generally to gas-discharge devices and more particularly to electrodeless high-frequency light sources.

Known in the art is an electrodeless light source which is accomplished in the form of a quartz tube featured by the fact that an operating gas is passed therethrough and provided with a field coil which is essentially a solenoid fitted onto the above-mentioned tube.

The disadvantages inherent in the aforementioned electrodeless light source are low efficiency of utilization of the power of a high-frequency generator which is due to the location of the field coil on the surface of the discharge tube involved as well as the bulky arrangement resulting from the necessity of continuous supply of the gas in the discharge tube in question.

It is a primary object of the present invention to eliminate the above-mentioned disadvantages.

The invention is aimed at the provision of a compact reliable in operation, convenient-to-service and high-intensive light source with utilization of a high-frequency discharge.

According to the invention said object is accomplished by the fact that in an electrodeless high-frequency light source employing a field coil which is essentially a solenoid supplied from a high-frequency generator, the entire length of the field coil is enclosed into insulation envelope and is placed within the bulb filled with operating gas, the ends of the insulation envelope being led out from the bulb to supply a coolant into the aforementioned envelope.

It is expedient that the envelope be made of quartz.

Such a construction of an electrodeless high-frequency light source has made it possible to obtain high efficiency of utilization of the consumed power (up to 70 percent), to provide a super-power light source adapted for simulation of solar radiation, to prolong service life up to 10,000 operating hours and to provide the light source proper as a compact and convenient-to-service one.

The invention will be described hereinbelow by way of an exemplary embodiment thereof with due reference to the accompanying drawing which represents a general view of an electrodeless high-frequency light source, according to the present invention.

The electrodeless high-frequency light source consists of a quartz bulb 1 which is in the form of an ellipsoid. A quartz envelope 2 of a field coil 3 which is made of a quartz tube, is so

soldered into the quartz bulb 1 that the ends of the quartz envelope are led out from the quartz bulb. The field coil 3 is made of a multicore copper wire and is disposed within the quartz envelope 2 with the result that said field coil becomes essentially a solenoid, whose number of turns and the size are dependent upon the geometry of the quartz envelope 2. Quartz mounts 4 are soldered to the ends of the quartz envelope 2, whereas an adapter 5 is glued to the ends of the aforementioned mounts 4, the lead-out of the field coil 3 being fixed in position on said adapter 5 by means of a lock nut 6 providing a reliable electrical contact. By means of a gasket 7 and a locknut 8 a vacuum-tight connection between the adapter 5 and the lead-out of a high-frequency generator 9 is effected, said lead-outs being adapted to provide high-frequency power supply of the field coil 3, as well as to provide water delivery to cool down both the field coil 3 and the quartz envelope 2. The bulb 1 of a high-frequency light source is filled with xenon at a pressure capable of providing safe operation of the light source in question. Under the effect of the high-frequency current flowing through the field coil 3 a ring discharge occurs along the axis of the quartz envelope 2, the size of the above-mentioned discharge being dependent upon the number of turns and the height of the quartz envelope 2.

The employment of such a field coil, a distilled water for the purpose of cooling down both the field coil and the quartz envelope, as well as the application of a quartz bulb makes it possible to provide a directivity emission curve approximating the ring-type one.

Comparatively small size of the luminant body and explosion-proof operation provide the possibility to employ the light source in contemplation in relatively simple optical systems.

The absence of metal elements in the zone of discharge makes stable spectral characteristics obtainable throughout the service life.

We claim:

1. An electrodeless high-frequency light source, comprising: a bulb filled with operating gas; a field coil which is essentially a solenoid, supplied from a high-frequency generator, the entire length of said coil being enclosed in an insulation envelope and displaced within said bulb; the ends of the above-mentioned insulation envelope are led out from said bulb to supply a coolant through said ends into said envelope.

2. An electrodeless high-frequency light source as claimed in claim 1, wherein an insulation envelope is made of quartz.

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