

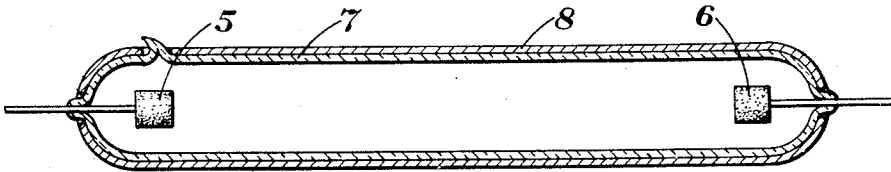
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M. PIRANI

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GASEOUS ELECTRIC DISCHARGE DEVICE

Filed July 22, 1931



INVENTOR  
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## UNITED STATES PATENT OFFICE

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## GASEOUS ELECTRIC DISCHARGE DEVICE

Application filed July 22, 1931, Serial No. 552,453, and in Germany August 21, 1930.

- The present invention relates to gaseous electric discharge devices generally and more particularly the invention relates to such devices in which the gaseous atmosphere consists wholly or in part of a metal vapor similar to the device disclosed in co-pending application, Serial Number 459,868, filed June 9, 1930, being the invention of Marcello Pirani and Martin Reger.
- 10 As pointed out in the specification of the application referred to above the metal vapor present in the container of the device condenses readily when the walls of the container are cooled by the outside temperature
- 15 which changes the operating characteristics of the device. The object of the present invention is to prevent the condensation of the metal vapor present in gaseous electric discharge devices.
- 20 The invention attains its object by coating the walls of the container of the electric discharge device with a material which transmits all the visible light radiations emitted by said device, but which absorbs all the
- 25 infra-red or heat rays emitted by said device. Gold or silver are suitable materials for this purpose and are applied to the container in a very thin film, or a dustlike coating, or deposit by methods well known in the
- 30 arts, such as by chemical deposition, or cathode sputtering. I have found that a film of gold due to its slightly yellowish green tinge is most suitable for a device having sodium vapor therein and silver due to its
- 35 weak blue tinge is most suitable for a device having a filling of cadmium, or mercury vapor.
- In the drawing accompanying and forming part of this specification an embodiment
- 40 of the invention is shown in sectional side elevation.
- Referring to the drawing the gaseous electric discharge device comprises a glass container 7, having electrodes 5 and 6 sealed
- 45 therein and a gaseous atmosphere therein, said gaseous atmosphere consists either of a metal vapor such as mercury, sodium, potassium cadmium, zinc, or calcium, or of a mixture of a metal vapor with a discharge
- 50 conducting gas. Electrodes 5 and 6 are of the electron emitting, sintered, mixed metal and oxide type, which glow during the operation of the device and which permit the use of a high current density to heat the container 7. Glass container 7 is made of the usual glasses 55 well known in the art, such as lead glass, lime glass, soda glass. Said container 7 is coated externally with an extremely thin film, or dustlike covering, or deposit 8 of metal such as gold, or silver which absorbs 60 the infra-red, or heat rays emitted by the gaseous electric discharge device, but which transmits the visible light radiations emanating from said device as is well known in the arts. Such a coating of silver also transmits the ultra-violet radiations emanating 65 from an electric discharge device filled with mercury vapor or other gaseous filling rich in such radiations and having a container which is transparent to ultra-violet radiations such as a quartz container. Having this 70 construction the container 7 of the device is maintained at a high temperature so that the metal vapor present in the gaseous atmosphere does not condense. If desired only 75 those parts of the container which are heated but slightly by the gaseous discharge during the operation of the device may be covered with the gold or silver coating.
- It will be understood of course that where 80 an alkali metal vapor, such as sodium, is used in the gaseous atmosphere of the device container 7 should be made of a glass resistant to the effects of such metal vapor, such as, the glass disclosed in co-pending application 85 Serial Number 470,436, filed July 24, 1930, being the invention of George Gaidies and Marcello Pirani.
- While I have shown and described a particular embodiment of my invention it will 90 be understood that various substitutions, modifications, and changes may be made in the form and details thereof without departure from the broad spirit and scope of the invention, for example, the container 7 may 95 be a double walled container similar to that described in the co-pending application referred to hereinbefore, any suitable type of electrodes may be used and any of the well known methods of applying the heat absorb- 100

ing metal to the glass container may be used such as those employed in the manufacture of fractionating mirrors.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In an electric discharge device, a container, a filling of discharge supporting easily condensible metal vapor therein, electrodes sealed therein, and a transparent noble metal coating on said container.

2. In an electric discharge device, a container, a filling of discharge supporting easily condensible metal vapor such as sodium vapor therein, electrodes sealed therein, and a transparent coating of gold on said container.

3. In an electric discharge device, a container, a filling of discharge supporting easily condensible metal vapor such as cadmium vapor therein, electrodes sealed therein, and a transparent coating of silver on said container.

4. In an electric discharge device, a container, a filling of discharge supporting easily condensible metal vapor therein, electrodes sealed therein, and an exterior coating of noble metal on said container.

In witness whereof, I have hereunto set my hand this 10th day of July, 1931.

MARCELLO PIRANI.

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