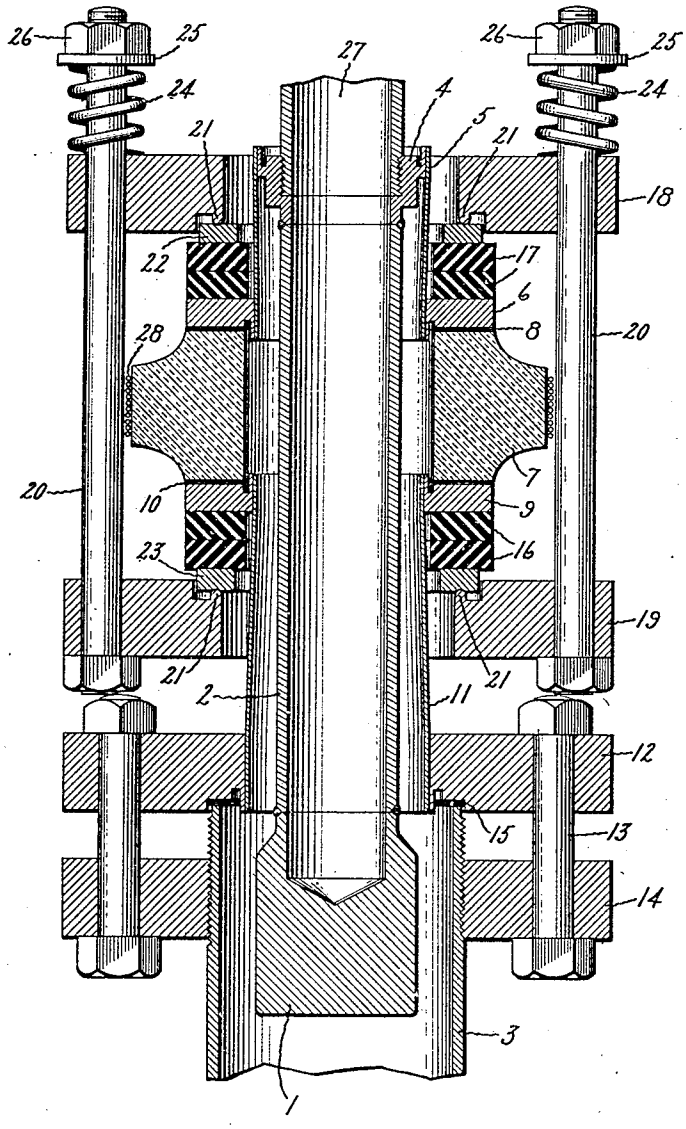
W. E. STORY, JR.

INSULATING GAS TIGHT SEAL.

APPLICATION FILED SEPT. 19, 1914.

1,215,074. Patented Feb. 6, 1917.



Witnesses:

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM E. STORY, JR., OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

INSULATING GAS-TIGHT SEAL.

1,215,074. Specification of Letters Patent. Patented Feb. 6, 1917.

Application filed September 19, 1914. Serial No. 862,568.

To all whom it may concern:

Be it known that I, WILLIAM E. STORY, Jr., a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Insulating Gas-Tight Seals, of which the following is a specification.

The present invention relates to the construction of vacuum-tight insulating seals which are of particular utility in high-powered vapor electric devices provided with a metallic container.

One of the main difficulties experienced in this class of devices is the maintenance of a perfect gas-tight condition of the seals at the electrodes as the temperature variation in the course of ordinary operation is considerable. In a previous Patent No. 1,118,380, filed May 10, 1913, I have disclosed means for reducing the variations of the anode temperature by making the anodes hollow and providing therein a quantity of mercury, which may be kept hot during periods of inaction by an electric heater. I have also shown a seal including a section of porcelain.

A feature of my invention is the means for joining the seal to the neighboring part of the apparatus by a wall having a relatively low thermal conductivity.

The accompanying drawing is a longitudinal section of an anode seal embodying my invention, the main part of the rectifier not having been shown.

Referring to the drawing, the anode 1, consisting of steel, tungsten or other metal is welded to a steel tube 2, and is located within an anode arm, or side chamber 3 of the rectifier, although my invention is equally applicable to rectifier constructions in which the anode is located in the main container. A threaded ring 4 is welded to the upper end of the tube 2 and to a tube 5 having as shown a thinner wall than the container proper and consisting preferably of soft steel, or other metal of relatively low heat conductivity. A ring 6 consisting of a metal, such as nickel steel, having substantially the same coefficient of expansion as porcelain is welded to the opposite end of the tube 5, and this ring 6 adjoining a section of porcelain insulation 7 with the interposition of suitable washers 8 of aluminum, lead or like soft metal. Adjacent the opposite and lower side of the porcelain ring 7 is another ring 9 of nickel steel, suitable washers 10 being here also used. To the ring 9 is welded a thin walled tube 11. To the opposite end of the tube 11 is welded a ring 12 consisting of iron or steel and drawn against the anode chamber wall 3 by means of a bolt 13 passing through the ring 12 and through a ring 14 attached by screw threads or otherwise to the metal anode tube 3. Here also suitable washers 15 are used. Bearing on the nickel steel ring 6 and 9 are rings of insulation 16, 17, such, for example, as a composition of asbestos and calcium silicate described in Patent #1,009,630 to L. E. Barringer. Pressure is applied upon the ring 16 and thus upon the seal by drawing together the rings 18, 19 by bolts 20. In order to distribute the pressure squarely upon the seal, the rings 18, 19 preferably are provided with rounded ridges 21 which bear upon the center of steel rings 22, 23, these rings in turn bearing respectively against the insulating sections 17, 16. In order to make the pressure continuous stiff springs 24 are preferably interposed between the washers 25 and the ring 18, these springs being compressed by tightening the nuts 26.

As described in my former application, a quantity of liquid, for example, mercury, may be placed in the tube 2 and this may be kept heated by suitable means not illustrated and not forming a part of the present invention. A tube 27 has been indicated partly broken away joined to the anode tube and serving to condense the mercury vapor. A steel wire 28 may be tightly bound around the porcelain to increase its mechanical resistance to strains and prevent cracking.

The described construction prevents overheating and sudden changes of temperature of the seal as heat from the anode tube 2 and the container wall 3 inclosing the anode can reach the seal by conduction only through a relatively long path of poorer heat conductivity than the container proper, afforded by the tubes 5 and 11. The resiliency of these thin-walled tubes also reduces mechanical strains on the seal.

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

1. The combination of a container, an electrical conductor, an insulator interposed between said conductor and said container

and resilient members connecting said insulator respectively to said conductor and said container, said members having a lower heat conductivity than said container.

2. The combination of a container, an electrical conductor, a ring of mineral insulation interposed between said conductor and said container, metal rings adjoining said mineral ring, washers interposed respectively between said mineral ring and each of said metal rings, tubes of resilient material having thinner walls than said container and a relatively low heat conductivity joined respectively one to a metal ring and the container, and another to a metal ring and the conductor and mechanical means for maintaining said metal rings and said mineral ring in gas-tight relation.

In witness whereof, I have hereunto set my hand this 18th day of September 1914.

WILLIAM E. STORY, JR.

Witnesses:

BENJAMIN B. HULL,

BENJ. H. WEISBROD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."