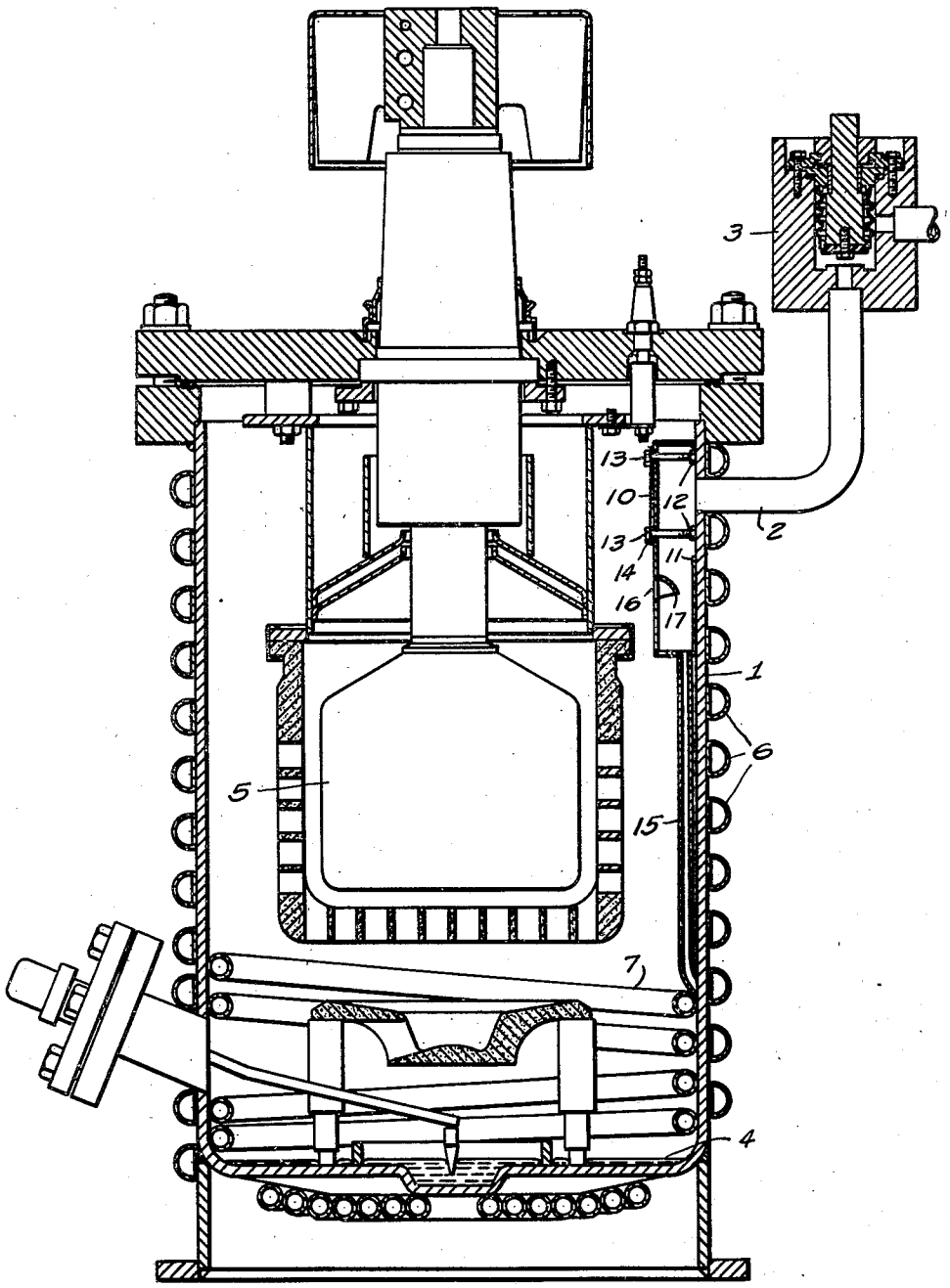
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WITNESSES:

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Our invention relates to a vapor electric device and particularly to a device for controlling condensed mercury to prevent arc back in a vapor electric valve.

The chief difficulty in the operation of vapor electric valves is the occurrence of random arc backs or loss of valve action in the device. In the operation of vapor electric converters, it is customary to provide pumping means for constantly removing foreign gases from the valve containers. Small quantities of mercury vapor pass into the pumping connections and are condensed therein. It is customary to allow the condensed mercury vapors to return to the valve chamber in order to prevent depletion of the mercury content therein.

It has recently been discovered that the condensed mercury returns to the valve chamber in the form of comparatively large globules. We have observed that the return of these globules frequently coincide with the occurrence of an arc back in the converter, and tests have been indicated that an arc back can be caused by introducing a globule of mercury and allowing it to enter the valve through the evacuating system. We have discovered that when a globule of mercury enters the valve container it spatters in small drops which are projected in every direction in the container and that when the drops strike the anode an arc back almost always follows.

According to our invention, we provide a trap or control device for preventing the returning mercury globules from spattering at random through the converter and thus prevents the occurrence of an arc back when a mercury globule is returned to the converter chamber.

We have found that the best control device is constructed in the form of a box-like receiving chamber secured in communication with the pumping connection and formed so that it conforms to the wall of the container so that it not only is in intimate contact therewith to prevent mercury spilling between the edges of the container and the mercury receiver but also so that the trap itself is in good thermal contact with the cooled wall of the container.

The mercury globules received in the trap are returned to the cathode by means of a tubular connection which extends into the vicinity of the cathode and preferably is so shaped that descending globules of mercury are deposited against the wall of the container and either in contact with the surface of the mercury or behind some obstruction such as an internal cooling coil which prevents splashing of the mercury.

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In order to permit the evacuation of the gases through the mercury trap, an opening or louver is provided for the passage of gases into the box and baffles or shields are provided for preventing splashing of mercury through the gas passage.

It is accordingly an object of our invention to provide means for preventing mercury globules from splashing when returned to the valve container.

It is a further object of our invention to provide an antisplashing device for condensed mercury vapor.

It is a further object of our invention to provide means for preventing arc backs caused by condensed mercury vapor.

Other objects and advantages of our invention will be apparent from the following detailed description taken in conjunction with the accompanying drawing in which the figure is a sectional elevation of a vapor electric valve embodying our invention.

In the exemplary embodiment of our invention, the vapor electric valve comprises a container 1 which is evacuated through a pumping connection 2 controlled by means of a vacuum valve 3. Within the container 1 is a pool-type cathode 4 usually composed of mercury and a cooperating anode 5 in spaced insulated relation to the cathode 4 and the valve chamber.

In order to condense the cathode vapor, the side walls of the container 1 are eequipped with cooling means such as cooling coils 6 and preferably cooling coils 7 are inserted within the container 1 adjacent to the cathode surface. Various shields and baffles as are desired are placed between the cathode 4 and anode 5 to control the operation and reliability thereof.

The preferred form of mercury globule control comprises a box-like receiving chamber 10 preferably constructed of sheet metal such as sheet steel, having one side shaped to conform closely to the inner wall of the valve container 1 and having an opening 11 coinciding with the pumping connection 2.

The box-like receiving chamber 10 may be connected to the tank wall by any suitable means, we prefer to provide a connection by welding or otherwise securing a pair of nut-like members 12 to the wall of the valve container 1, and attaching the receiving chamber 10 by means of screws 13 connected to the aforesaid nuts 12. If desired, a fastening member 14 may be provided for preventing loosening of the screws 13 during shipping or operation of the converter.

A return passage for mercury is provided by welding a tubular return passage 15 into the bottom of the receiving chamber 10 and extending it into the vicinity of the cathode 4. As shown, the return passage 15 terminates adjacent the wall of the container 1 and behind the internal cooling coil 7.

Preferably, the lower end of the return passage 15 is so shaped that the returning mercury is discharged directly against the cooled wall of the container 1 and in such manner that it will be received behind the cooling coil 7 from which it will flow downwardly along the wall of the container 1 to the cathode 4. When such internal cooling coils 7 are not provided, the passage 15 would obviously be extended to the surface of the cathode 4.

In order to allow the pumped gases to flow freely through the receiving chamber 10, a gas passage or louver 16 is provided in the receiving chamber 10 and this may conveniently be done by striking out a portion of the wall of the receiving chamber 10, in which case the struck up portion 17 will provide a shield or baffle to prevent the splashing of mercury drops through the gas passage 16. Obviously, instead of being integral with the receiver wall, the mercury baffles 17 might be provided in any suitable manner.

While the gas passage 16 may be provided at any suitable position in the receiving chamber 10, we prefer to construct the chamber so that the gas passage 16 is an appreciable distance below the pumping connection 2.

In the operation of the construction according to our invention, the vaporized mercury will be drawn into the pumping connection 2 and condensed therein, partly in the pumping manifold or in the chamber of the control valve. From these positions the mercury returns to the chamber in relatively large drops or globules.

When entering the container 1, the mercury, because of its surface tension, breaks up into relatively small droplets which are projected into substantially every direction, and if our baffle or receiving chamber 10 was not present some of the droplets would be brought into contact with the anode 5, and our experience has indicated that this results almost always in an arc back to the anode 5. However, in a container provided with our receiving chamber 10, the droplets are controlled by the receiving chamber 10 and fall downwardly and are collected in the bottom of the chamber 10 and returned through the return passage 15 to the vicinity of the cathode 4 without material splashing or contamination of the anode.

In certain installations, the application of our mercury control system has resulted in the reduction in arc back rate of the order of 65% of the previous rate.

While, for purposes of illustration, we have shown and described a specific embodiment of our invention, it will be apparent to those skilled in the art that changes and modifications can be made therein without departing from the true spirit of our invention.

We claim as our invention:

1. A vapor electric device having a substantially closed container, an anode and a mercury pool cathode therein, a pumping connection to said container and means for preventing splashing of mercury returning through said pumping connection comprising a box secured in position to receive any mercury entering through said pumping connection, a passage extending from said box into the vicinity of said cathode, a window to permit gas to pass through said box to said pumping connection and baffle means interposed between said window and said pumping connection for restraining the splashing of mercury through said window.

2. An arc back protector for a vapor electric device having a pair of co-operating main electrodes in an evacuated container comprising a pumping connection to said container, a receiving chamber secured to the inner side of said container, said chamber having an opening communicating with said pumping connection, the edges of said opening being secured in contact with the container wall, a passage from said chamber to the vicinity of the bottom of the container, a second opening in said chamber and a shield interposed between said second opening and said pumping connection for intercepting mercury drops passing through said chamber.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,121,599	Kilgore	June 21, 1938
2,189,612	Pakala	Feb. 6, 1940
2,265,608	Marti	Dec. 9, 1941