S. W. FARNSWORTH.

DIRT COLLECTOR FOR RECTIFIERS.

APPLICATION FILED NOV. 6, 1914.

1,199,459. Patented Sept. 26, 1916.

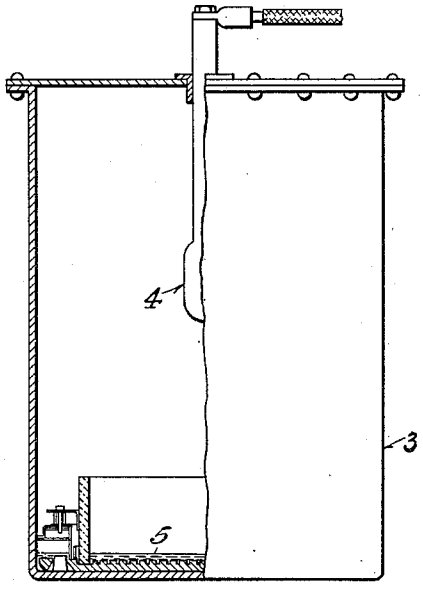
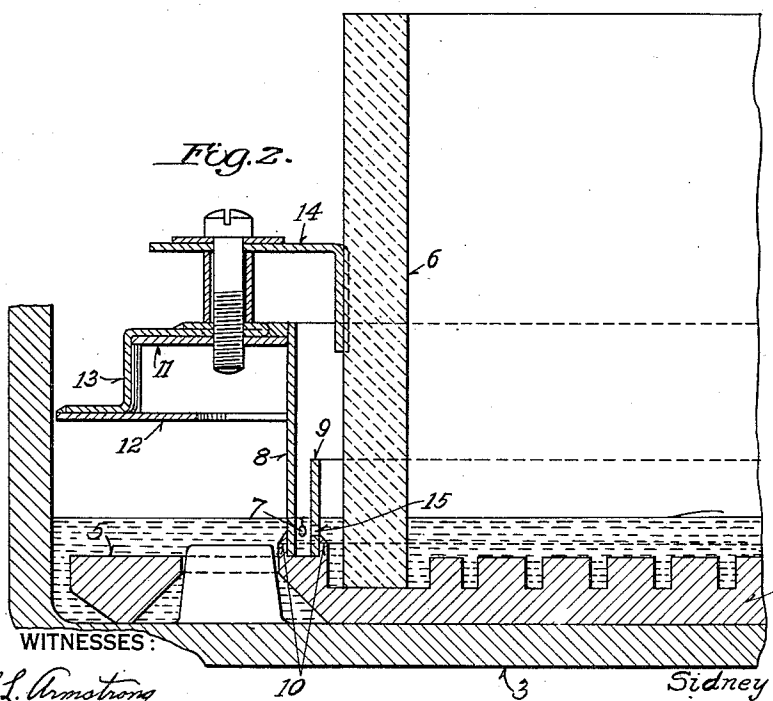


Fig. 1

Fig. 2.



WITNESSES:

S. L. Armstrong

D. C. Davis

INVENTOR

Sidney W. Farnsworth

BY

Burley & Carr

ATTORNEY

UNITED STATES PATENT OFFICE.

SIDNEY W. FARNSWORTH, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

DIRT-COLLECTOR FOR RECTIFIERS.

1,199,459. Specification of Letters Patent. Patented Sept. 26, 1916.

Application filed November 6, 1914. Serial No. 870,609.

To all whom it may concern:

Be it known that I, SIDNEY W. FARNSWORTH, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Dirt-Collectors for Rectifiers, of which the following is a specification.

My invention relates to evacuated vapor apparatus provided with reconstructing liquid electrodes, and it has for its object to provide means whereby the surfaces of the liquid electrodes in apparatus of the character specified, may be maintained free from foreign substances at all times.

In the manufacture of mercury vapor rectifiers, extreme care is used to have all portions of the interior of the container absolutely clean and free from foreign substances. This is, however, a very difficult task, especially with rectifiers of large capacity provided with metal containers and with elaborate shielding systems. Not only does dirt appear to lodge in minute recesses in the metal but also small portions of the metal itself are torn off by the arc. The mercury vapor, in apparatus of the character specified, is continually condensing on the outer walls of the container and dripping back to the cathode pool and this condensed mercury takes up dirt particles from all portions of the container and washes them back into the cathode where they disturb the cathode surface, and, by their vaporization, destroy the homogeneous character of the arc itself. By my invention, I am able to prevent the return of dirt particles to the active portion of the cathode spot in a simple and effective manner.

Referring to the accompanying drawing, Figure 1 is a side view of a metal rectifier embodying my invention, partially in section and partially in elevation; and Fig. 2 is an enlarged view of a portion of the rectifier shown in Fig. 1, showing my invention in greater detail.

A container 3 of refractory impervious material, such, for example, as steel, is provided with a solid anode 4 and with a liquid cathode 5, preferably of mercury. An anti-splash plate 4, of the type described and claimed in my application Serial No. 829,825, filed April 6, 1914, and assigned to the Westinghouse Electric & Manufacturing Company, is preferably placed upon the bottom of the container 3 and is submerged by the liquid of the cathode 5, under normal conditions. A cathode ring 6, of some refractory insulating material, such, for example, as quartz, is mounted on the plate 4 and serves to divide the cathode pool 5 into two portions, a substantially circular inner portion, upon which the arc is started and maintained by any suitable means, and an outer annular inactive portion. The mercury vapor of the arc condenses upon the side walls of the container 3 and drips into the annular inactive portion of the cathode pool, carrying with it dirt freed from the walls. This dirt, in all instances, floats upon the surface of the mercury because of the relatively high specific gravity of the latter. Consequently, by maintaining free communication between the inner and outer portions of the pool 5 through small passages under the edge of the ring 6, clean mercury is permitted to pass from the lower portions of the inactive cathode 5 to the central active portion thereof in order to maintain the level of the latter.

The structure which has been described to this point is sufficient to maintain the active portion of the cathode clean when the rectifier is maintained in a stationary position as, for example, in a substation, but, when it is desired to mount rectifiers of the character described upon electric locomotives, as is frequently the case, it is found that the violent blows and vibrations to which they are subjected cause mercury to splash directly from the outer pool to the inner pool over the edge of the ring 6, carrying with it dirt particles. I accordingly mount two rings 8 and 9, preferably formed of metal, outside the ring 6 and attach them securely in place, as for example, by welding them to the plate 4, as shown at 10. The rings 8 and 9 are provided with holes 7 and 15 below the surface of the mercury and staggered with respect to each other. A flat ring 11, preferably of metal, is attached to the ring 8, near its upper edge, in any suitable manner, such as by welding, and supports a ring 12 by suitable brackets 13. Additional support may be given to the refractory ring 6 and also to the rings 8 and 11 by the use of auxiliary braces 14 therebetween.

By the use of the above described structure, the outer inactive cathode pool is ex-

tremely restricted in its movement because of the baffling action of the rings 8, 11 and 12. Condensed mercury may flow thereinto between the brackets 13 and between the outer edge of the ring 12 and the wall of the container and may return to the central portion of the cathode by means of the holes 7 and 15 and under the ring 6, but it is extremely difficult for any mercury to be splashed over the upper edge of the ring 6.

While I have shown my invention in its preferred form, those skilled in the art will understand that it is susceptible of various minor changes and modifications without departing from the spirit thereof and I accordingly desire that only such restrictions shall be placed thereupon as are imposed by the prior art or are specifically set forth in the appended claims.

I claim as my invention:

1. The combination with an evacuated container, of a reconstructing liquid electrode therein comprising an active arc-supporting pool and an inactive pool arranged to receive returning electrode material, a partition separating the surfaces of said pools and permitting communication therebetween below the surfaces thereof, and baffle plates arranged above said inactive pool to prevent slopping thereof over said partition and into said active pool when said electrode is agitated.

2. The combination with an evacuated container, of a reconstructing liquid electrode therein, a ring of refractory material seated in said electrode, extending above the surface thereof and dividing said electrode into an active inner pool and an inactive outer pool, said ring providing passages between said pools beneath its lower edge, and baffle plates arranged above said inactive pool to prevent the slopping of electrode material from said inactive pool to said active pool over the upper edge of said ring when said electrode is agitated.

3. The combination with an evacuated container, of a reconstructing liquid electrode therein, a ring of refractory material seated in said electrode, extending above the surface thereof and dividing said electrode into an active inner pool and an inactive outer pool, said ring permitting communication between said pools beneath its lower edge, and annular partition members mounted in said inactive pool and provided with relatively staggered openings beneath the surface thereof.

In testimony whereof I have hereunto subscribed my name this 29th day of Oct., 1914.

SIDNEY W. FARNSWORTH.

Witnesses:
JOHN BIRRELL,
B. B. HINES.