J. STEYNIS.

INSULATING DEVICE.

APPLICATION FILED MAR. 29, 1909.

954,597.

Patented Apr. 12, 1910.

Fig. 1.

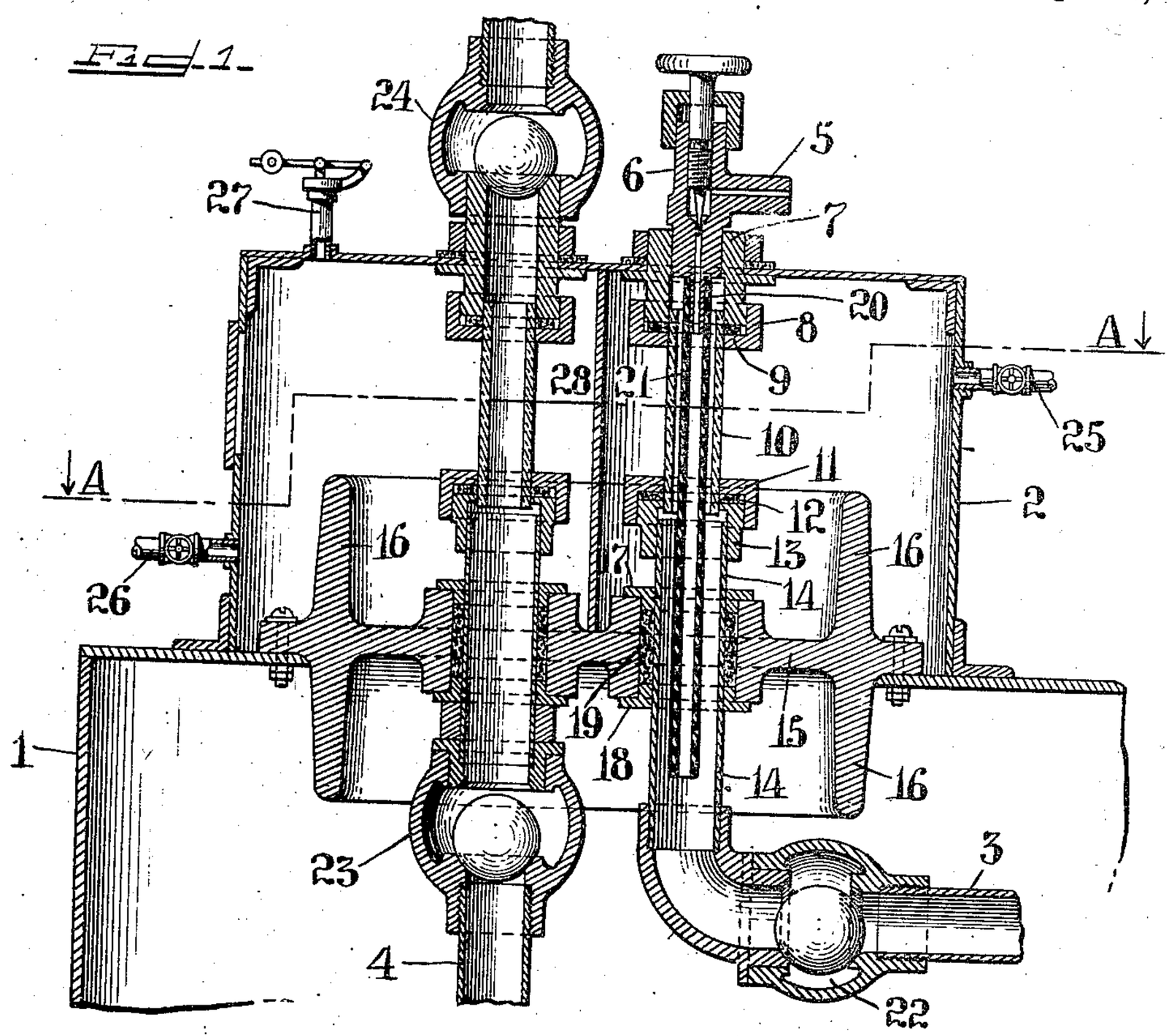
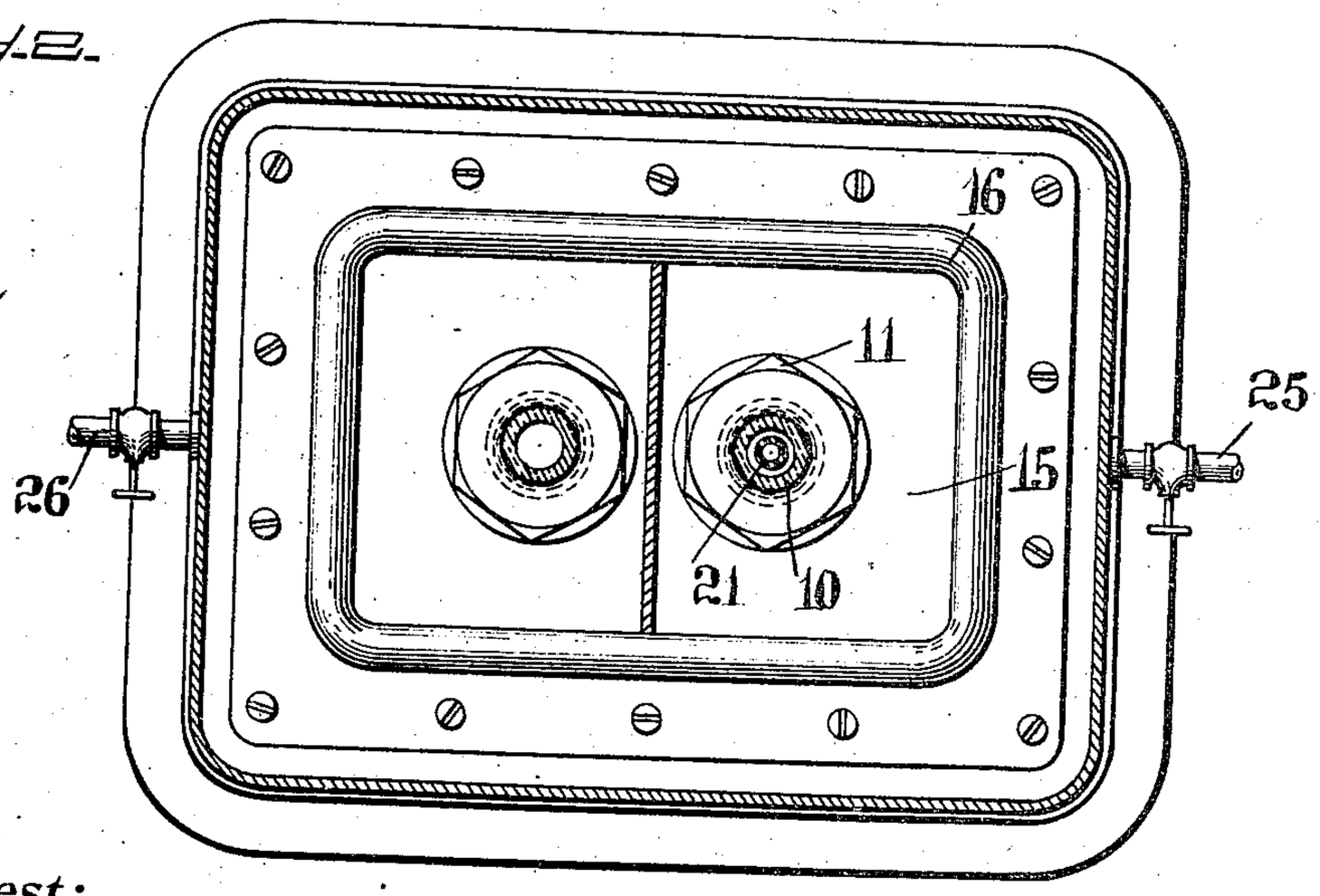


Fig. 2.



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UNITED STATES PATENT OFFICE.

JAN STEYNIS, OF BABYLON, NEW YORK, ASSIGNOR TO STEYNIS OZONE COMPANY, A CORPORATION OF NEW YORK.

INSULATING DEVICE.

954,597. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed March 29, 1909. Serial No. 486,295.

To all whom it may concern:

Be it known that I, JAN STEYNIS, a subject of the Queen of the Netherlands, residing at Babylon, Long Island, State of New York, have invented certain new and useful Improvements in Insulating Devices, the following being a full, clear, and exact disclosure of one form of my invention, which I at present deem a preferable embodiment thereof.

My invention relates to an insulating device for preventing an electric current, either of the alternating or direct form, from being conducted along pipes or conduits connected with electrodes or similar devices in which fluid or gaseous substances are used.

My invention is of special utility for insulating pipes which furnish a liquefied, expansible gas to hollow electrodes of an ozonizer for the purpose of cooling same.

As is known in the art relating to the production of ozone, the electrodes may consist of hollow bodies placed alternately in relation to each other as concerns their polarity. Each alternate electrode must be insulated not only from the ground but from the pipes which supply the liquefied gas for cooling, the other electrodes being grounded so as to have the same polarity as the earth, the transformer or other device for supplying power also being grounded at one terminal. It will also be understood that liquefied gas must be so treated that when in liquid form it will not constitute a conducting path for the electric current. This object is also accomplished by my invention in a simple and efficient way.

For a detailed description of one form of my invention, reference may be had to the following specification and to the accompanying drawing forming part thereof, in which—

Figure 1 is a vertical sectional view of my improved insulating device, and Fig. 2 is a horizontal sectional view taken substantially upon the line A A of Fig. 1.

Referring to the drawing, the numeral 1 indicates the casing of an ozonizer or other apparatus upon which the device may be used, and the numeral 2 indicates the casing for the insulating device and mounted upon the casing 1.

The numeral 3 indicates a pipe passing to the electrode of the ozonizer, and the numeral 4 the return pipe for conducting the expanded gas back to the compression apparatus.

The supply of liquefied gas is conducted to the nipple 5 of the needle valve 6, the latter being for the purpose of controlling and regulating the amount of liquefied gas which passes through the system. The needle valve is carried by or connects with the bushing 7 passing through the casing 2, and said bushing is provided with a screw cap 8, within which is placed a suitable packing ring 9, preferably of rubber. The bushing 7 is also adapted to receive one end of a glass tube 10, and a fluid-tight joint between said tube and said bushing is formed by the cap 8 and the packing 9. Although I have specified the tube 10 as being composed of glass, any other suitable material may be used, such as porcelain, quartz, etc. The lower end of the tube 10 passes through a cap 11, packing ring 12 and bushing 13, which are carried upon the end of a tube 14 of metal or other suitable material.

The bottom of the chamber formed by the casing 2 preferably consists of a flanged plate 15 made of porcelain or suitable electrically non-conducting material. The flanges 16 preferably extend both above and below the plate 15, in order to increase the surface of the said insulating wire. The tube 14 passes through the plate 15 and is retained in position thereon by annular, screw-threaded plates 17 and 18, between which is introduced the packing 19. The needle valve 6 is provided with a small, cylindrical extension 20 which passes within and supports an insulating tube 21 preferably made of soft rubber or other similar flexible non-conducting material. The flexible tube 21 extends downward for a considerable distance through the glass tube 10 and its connecting tube 14, as shown in Fig. 1.

The insulation of the return pipe 4 is accomplished in a manner similar to that of the inlet pipe 3, the exception being that no inner insulating tube is carried, and of course the needle valve is also omitted.

Interposed between the inlet pipe 3 and the tube 14, is a check valve 22 which is designed to operate to close said inlet pipe whenever an abnormal pressure or an abnormal flow of the gas through the pipe takes place, such as in case of a rupture of pipe 3 or its connecting parts, or in case of the

rupture of any part of the insulating device. Similar check valves 23 and 24 are also provided to stop the flow in pipe 4, should a rupture take place in the insulated portion of the device.

The casing 2 is provided with valved inlet and outlet pipes 25 and 26 which are for the purpose of driving out moist air from the chamber formed by the casing 2, and substituting dry air or any other suitable fluid therefor. The casing 2 is also provided with a relief or safety valve 27, which will not only release any abnormal pressure within the casing 2, but will also indicate the presence of a leak in the tubes comprising the insulating device, since the gas would expand in the chamber formed by such casing and escape through said relief valve 27.

The casing 2 is preferably divided into two parts which contain the inlet and outlet tubes respectively by a partition 28 which extends from the insulating plate 15 to the top of the casing 2. This is for the purpose of preventing pieces of one of the tubes from hitting or contacting with other of said tubes, should one become broken by accident. Inasmuch as this partition 28 extends only between the flanges 16 and the insulating plate 15, there is free circulation through the chamber formed by the casing 2 from the pipe 25 to the pipe 26.

The functions of my improved insulating device may be described as follows: Supposing liquefied gas be admitted through the nipple 5, the same passes through the needle valve 6, which may be adjusted to permit the passage of the requisite amount of the liquid, after which the gas passes into the inner rubber tube 21, where the initial expansion takes place. The gas therefore issues from the lower end of this tube in the form of a vapor, which immediately passes through check valve 22 and the pipe 23, during which passage further expansion takes place.

It should be noted that the space between the outer surfaces of the tube 21 and the inner surfaces of the tubes 10 and 14 are not subject to any flow of the gas, the gas being retained therein substantially inert. Therefore the cold produced by the expansion of the gas is very slowly communicated to the glass tube 10, which prevents the glass tube from being cracked or broken by having a too great range of temperature between its interior and exterior surfaces.

Since the liquefied gas issues from the lower end of the inner tube 21 in the form of a vapor, although not completely expanded, there is no tendency for the electric current to follow the path of the liquefied gas so that it might leak through the valve 6, the nipple 5 and the supply pipe connected with the latter, which is, of course, grounded.

In order to prevent moisture from collecting upon the surfaces of the parts of the insulating device, perfectly dry air may be forced in through the valved pipe 25, and may be allowed to flow out through pipe 26. This air is preferably dried by passing the same through a freezing chamber in which all moisture is deposited.

On starting up the apparatus with which the insulating device may be connected, the air previously contained within the casing 2 is forced out by the admission of dry air, and then the valves in the pipes 25 and 26 are closed, after which the interior of the chamber requires no further attention.

In view of the above description, it will be seen that I have produced a device for insulating electrodes and similar apparatus subject to high differences of potential, and at the same time I have provided means whereby the effect of moisture in the air, due to the humidity of a warm climate, is entirely eliminated, and I have also provided a device whereby it is not necessary to use an interrupting valve for dividing the liquefied gas into separate insulating drops or portions.

Having thus described this form of my invention, I wish it to be understood that I do not desire to be limited to the exact details of form and arrangement of parts set forth, for various changes may be made by others skilled in the art, without departing from the spirit and scope of my invention.

What I claim and desire to protect by Letters Patent is:

1. An insulating device for fluid conduits, comprising an insulating tube of electrically non-conducting material, a casing surrounding said insulating tube, and means for supplying dry gas to the chamber formed by said casing.

2. An insulating device for fluid conduits, comprising an insulating tube of electrically non-conducting material, a second insulating tube within the first-named tube, having its upper end connected with the fluid supply conduit, and its lower end passing through the first-named tube and extending beyond the same.

3. An insulating device for fluid conduits, comprising an insulating tube of electrically non-conducting material, a second insulating tube within the first-named tube, having its upper end connected with the fluid supply conduit and its lower end extending through and beyond the first-named tube, a casing surrounding the outer insulating tube, and means for supplying dry gas to the chamber formed by said casing.

4. An insulating device for fluid conduits comprising an insulating tube of electrically non-conducting material, an inner tube of non-conducting material passing through and terminating below the first-named tube, and a valve connecting directly with the

upper end of said inner tube for permitting expansion of said fluid within said inner tube.

5. An insulating device for fluid conduits, comprising an outer insulating tube of electrically non-conducting material, an inner tube located within and extending beyond said outer tube, the space between said inner and outer tubes being closed at the upper ends, and means for permitting the expansion of liquefied gas within said inner tube.

6. An insulating device for fluid conduits, connected with apparatus under high electric potential, comprising inlet and outlet pipes, tubes of non-conducting material located therein and situated adjacent each other, a casing surrounding said non-conducting tubes, and means for supplying dry gas to the chamber formed by said casing.

7. An insulating device for fluid conduits connected with apparatus under high electric potential, comprising inlet and outlet pipes, tubes of non-conducting material located therein and situated adjacent each other, an insulating plate through which the said conduits pass, a casing surrounding said non-conducting tubes, one side of which is formed by said insulating plate, and means for supplying dry gas to the chamber formed by said casing and said plate.

8. An insulating device for fluid conduits connected with apparatus under high electric potential, comprising inlet and outlet pipes, tubes of non-conducting material located therein and situated adjacent each other, an inner tube of non-conducting material located in the non-conducting tube of the inlet pipe and extending through and beyond the same, an insulating plate through which said conduits pass, a casing surrounding said non-conducting tubes, having one side formed by said insulating plate, and means for supplying dry gas to the chamber formed by said casing.

9. An insulating device for fluid conduits connected with apparatus under high electric potential, comprising inlet and outlet pipes, tubes of non-conducting material located therein and situated adjacent each other, an inner tube located in and passing through the non-conducting tube of the inlet pipe, an insulating plate through which said pipes pass, a casing surrounding said non-conducting tubes and having one side formed by said insulating plate, a valve carried by said casing and connecting with said inner tube of the inlet pipe, and means for supplying dry gas to the chamber formed by said casing.

10. An insulating device for fluid conduits connected with apparatus under high electric potential, comprising inlet and outlet pipes, tubes of non-conducting material located therein and situated adjacent to each other, an insulating plate through which said conduits pass, said plate being provided with laterally extending flanges, a casing surrounding said non-conducting tubes and having one side formed by said insulating plate, and means for supplying dry gas to said casing.

Signed at New York this 27th day of March, 1909.

JAN STEYNIS.

Witnesses:
WALTER S. JONES,
EDWARD W. VAILL, Jr.

Correction in Letters Patent No. 954,597.

It is hereby certified that in Letters Patent No. 954,597, granted April 12, 1910, upon the application of Jan Steynis, of Babylon, New York, for an improvement in "Insulating Devices," an error appears in the printed specification requiring correction as follows: Page 1, line 86, the word "wire" should read *plate;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3d day of May, A. D., 1910.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.