(No Model.)

W. P. NEWHALL.

ELECTRICAL CONDUCTOR FOR OIL TANK PROTECTION.

No. 250,950. Patented Dec. 13, 1881.

Fig. 2.

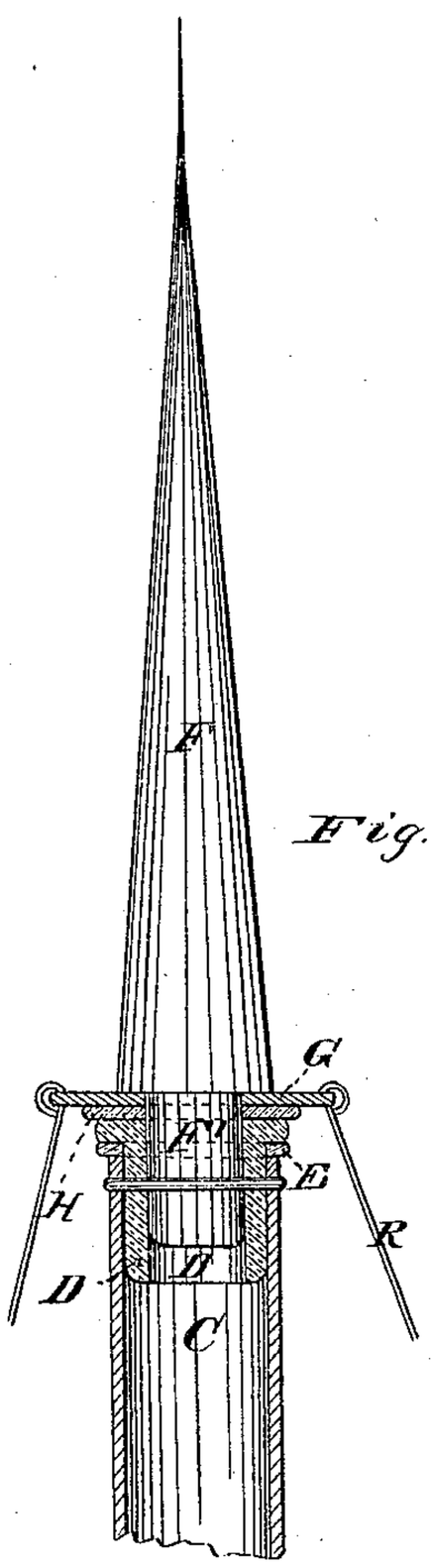


Fig. 1.

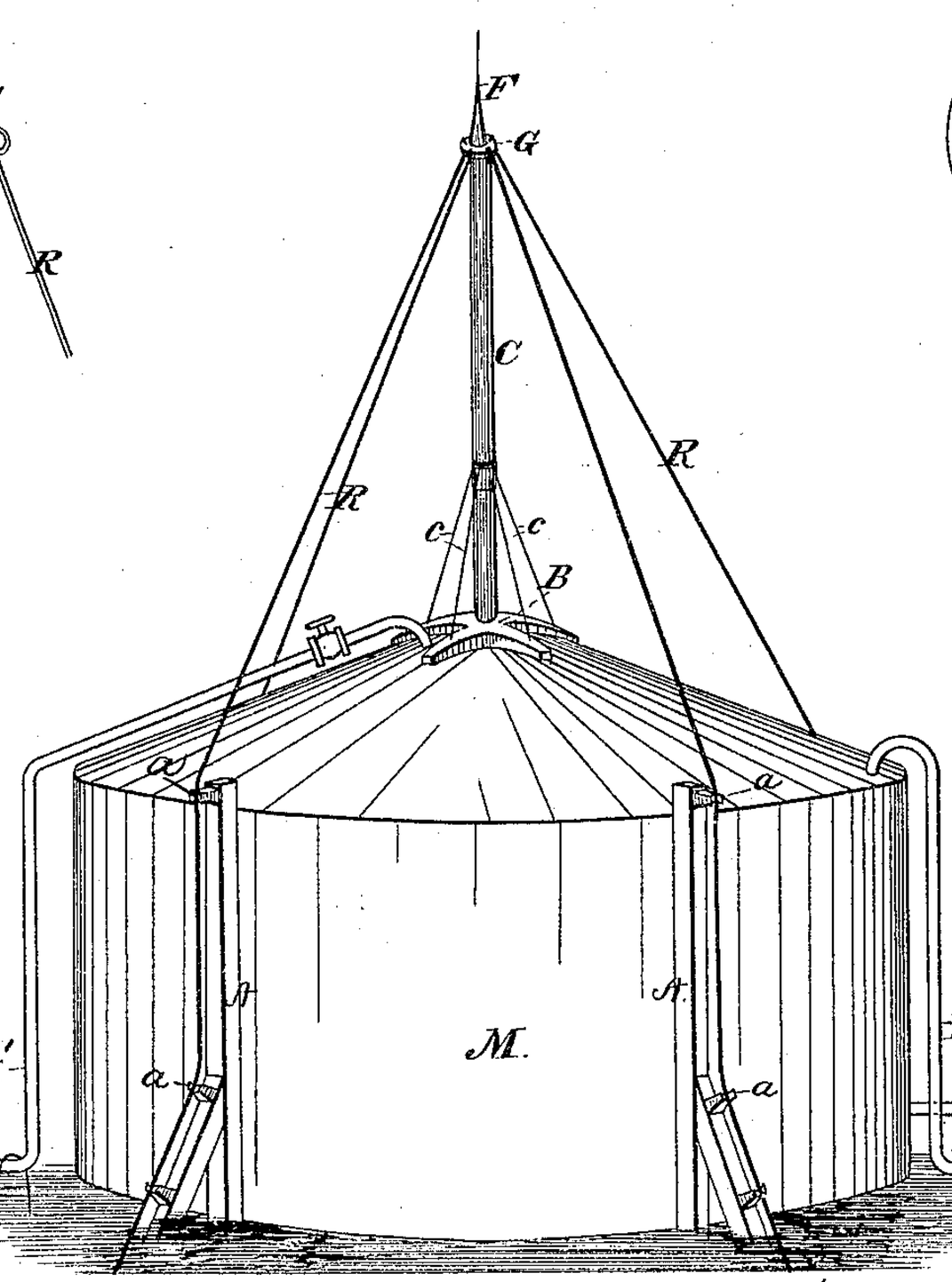
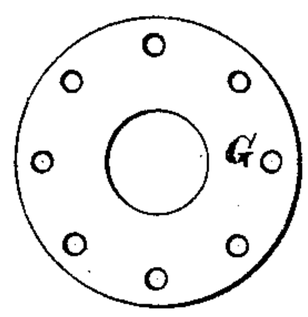


Fig. 3.



Witnesses
W. P. Edelen.
P. H. Porter.

Inventor,
Walter P. Newhall
per Hallock and Hallock
Attys.

N. PETERS. Photo-Lithographer. Washington. D. C.

UNITED STATES PATENT OFFICE.

WALTER P. NEWHALL, OF BRADFORD, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JAMES CASEY, OF SAME PLACE.

ELECTRICAL CONDUCTOR FOR OIL-TANK PROTECTION.

SPECIFICATION forming part of Letters Patent No. 250,950, dated December 13, 1881.

Application filed April 27, 1881. (No model.)

To all whom it may concern:

Be it known that I, WALTER P. NEWHALL, of Bradford, McKean county, Pennsylvania, have invented a new and useful Improvement in Electrical Conductors for Oil-Tank Protection; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and the letters or figures of reference marked thereon.

There is nothing that oil-producers fear more than a storm accompanied by lightning, which often strikes the tanks, either directly, or is conducted by the pipes, which form a perfect net-work over the country, to the tank, and produces the same effect as a direct stroke. In fact the majority of the tanks are struck in this way. Many devices have been used to prevent these calamities, but with little success. The principal and best system heretofore used consisted of a series of poles erected around the tank, and having rods which extend from below the surface of the ground to and over the top of the tank, thus forming a net-work. At different points upon this net-work points were distributed to receive the shock and distribute it to all the rods, which conveyed it from the tank. This system, though effective to a certain extent, did not meet all the requirements of the service for which it was intended. Furthermore it was expensive and hard to keep in repair, as the snow and ice in the winter would accumulate in such quantities upon the rods that they would break from the weight and generally be out of order at the very time they are needed the most—in the spring.

To remedy these defects and produce a device that will combine cheapness, strength, and ability to answer all the calls that it may be subjected to is the object of my invention; and to that end it consist of means whereby a single point can be used to produce the same effect as the many points upon previous devices; and it consists, further, in minor details, which will hereinafter be described, and pointed out in the claims.

In the drawings, Figure 1 represents a perspective view of an oil-tank having my system of protection applied thereto; Fig. 2, a sectional view of the point, its support, and the cup, and Fig. 3 a plan view of the flange upon the point.

M represents a tank having wooden posts A and rods C; B, a removable wooden support for C, which is stepped therein; F, a point having flange G, provided with holes for the rods R, which may be attached in any suitable manner; K, the oil-inlet pipe; K″, the oil-exit pipe, and K′ a pipe for conveying the gas from the tank to a distant point where it may be burned.

The rods heretofore used, as before stated, had many points to attract the electricity and convey it away from the tank. This effect can be produced by the use of a single point of sufficient capacity, if the latter be elevated a sufficient height above the tank to cover a radius greater than the tank. The rule for discovering this height is simple. A rod one foot in height will protect a radius of two feet. That being the case, it will only be necessary to find the diameter of the tank and divide it by two to find the height necessary to elevate the point. It is obvious, however, that the ordinary method of supporting a point will not apply to my device, as the electric fluid in passing through the rod may pass to the tank. To obviate this defect a foot, B, is placed upon but not attached to the center or apex of the top of the tank, and a metal tube, C, stepped therein.

The object in providing a metal tube is to furnish a support that will sustain the weight of the point and rods, and in the winter to sustain the additional weight caused by sleet and snow accumulating upon the rods and point. It therefore becomes necessary to insulate this tube at the top as well as at the bottom. To accomplish that end I place upon the top of the tube a glass cup, D, which receives the foot F′ of the point. The foot is held in place by a pin which passes through the cup, as shown in Fig. 2. The point is provided with flange G, having perforations near its perimeter to receive the ends of the rods. During high winds the point and rods will sway more or less, and if the glass be left in direct contact with the point and support the former would be fractured or broken by the tilting and grinding motion of the heavy point. To provide against any such accident a rubber packing, H, is placed between the flange

G and the cup D. Another packer may be placed between the cup D and the tube C. If desired, either packing may be dispensed with; but I prefer to use both.

The rods R are made of any suitable substance; but I prefer to use a copper cable. These rods are arranged in pairs—that is, the rod on one side has a corresponding rod on the other side, so as to form a couple—thus making a continuous circuit. The couples or pairs that can be used in this way is only limited by the circumference of the flange G, which may be of any diameter; but I prefer to use two pairs, as they are deemed to be sufficient for the purpose intended. To give the necessary ground-connection, I run the rods R over insulators *a*, which are attached to the wooden posts A, which should correspond in number to the rods. After leaving the posts the rods are inserted into the ground to a point where there is constant moisture. If the insulator be attached directly to the tank it will necessitate the expensive process of drilling holes in the latter. To avoid this posts, before referred to, are set in the ground against the side and fastened to the top of the tank in any suitable manner, and the insulator attached to them.

To prevent the electricity from following the pipes and thus striking the tanks a copper rod, *r*, is coiled around pipes K, K′, and K″, which, being of iron, will readily give off its electricity to the more susceptible copper. Any number of these coils may be placed along the line of pipe. Care should be used to insert the ends of the coil at a sufficient distance below the surface to strike the point of constant moisture, so that the electricity will not have any resistance in passing from the pipes K, K′, and K″. The pipe K′ is joined to the top of the tank at any suitable point; but I prefer to locate it near the apex, as shown. The object of this pipe is to convey the accumulated gases in the tank to any desired point, where said gas may be burned.

If desired, any number of pipes may be joined together and have one common burner. In each of these gas-pipes is placed a check-valve of any desired form, which will be arranged to operate at a certain pressure. It is preferred to use one that will open at a pressure a little less than that which would force the gas through the seam between the top and body of the tank. It is obvious that this form, while protecting the oil from evaporation, will keep any gas from escaping from any other point of the tank, and thus prevent the gas from igniting when the lightning plays around the point or in the neighborhood of the tank.

I am aware that it is not new to elevate a lightning-rod point by means of a non-conducting point; that it is not new to radiate a number of wires from a single point; and that it is not new to provide a support with a flange having perforations to receive guy-rods, and these I do not claim; but

What I do claim as new is—

1. A lightning-rod point having near its base a supporting-flange provided with perforations, in combination with an insulator having a rubber packing, substantially as described, a support projecting from the apex of a tank, and a series of rods attached to the flange and radiating therefrom to their ground-connections, substantially as described.

2. A lightning-rod point having near its base a supporting-flange provided with perforations, in combination with an insulator having a rubber packing, substantially as described, a support projecting from the apex of a tank, a series of rods attached to the flange and radiating therefrom to their ground-connections, and a series of posts corresponding in number to the rods and having insulators thereon, for the purpose set forth.

3. The flanged insulator-cup prevented from contact with the lightning-rod point and the cup-support by means of a flexible packing, substantially as shown, and for the purposes set forth.

4. An oil-tank having a loose wooden frame upon its top and serving as a support for a metal tube which supports a lightning-rod point, substantially as described.

5. An oil-tank having a loose wooden frame upon its top, a tube stepped in said frame, an insulator seated within said tube, and a lightning-rod point seated within the insulator, all combined and arranged substantially as set forth.

6. An oil-tank having a loose wooden frame upon its top, a tube stepped in said frame, an insulator seated within said tube, a lightning-rod point seated within the insulator, and a pin for fastening the tube, lightning-rod point, and insulator together, all combined substantially as described.

7. An oil-tank having a loose wooden frame upon its top, a tube stepped in said frame, an insulator seated within said tube and provided with a rubber packing, substantially as set forth, and a lightning-rod point seated within said insulator, substantially as described.

8. An oil-tank having a loose wooden frame upon its top, a tube stepped in said frame, an insulator seated within said tube and having a flexible packing, substantially as set forth, a lightning-rod point seated within the insulator, and a pin for fastening the lightning-rod point, tube, and insulator together, combined and arranged substantially in the manner described.

9. An oil-tank having a loose wooden frame upon its top and serving as a support for a tube, an insulator, a lightning-rod point having a flange provided with perforations, for the purposes set forth, and a series of rods attached to and radiating from the flange and having ground-connections, all combined and arranged substantially as set forth.

10. An oil-tank having a loose wooden frame upon its top and serving as a support for a tube, an insulator having a flexible packing, substantially as set forth, a lightning-rod point

having a flange provided with perforations for the purpose set forth, and a series of rods attached to and radiating from the flange and having ground-connections, all combined and arranged substantially as described.

11. An oil-tank having its radius protected by a lightning-rod point insulated above the center of the tank, and having rods provided with suitable ground-connections, in combination with pipes having copper rods coiled around them, substantially as shown, and having its ends extending below the surface of the ground to a point of permanent moisture, substantially as described, and for the purposes set forth.

12. An oil-tank provided with a gas-escape pipe having an automatic regulating-valve, a burner, and a copper coil wound around said pipe and having its ends extending below the surface of the ground to a point of permanent moisture, substantially as described, and for the purposes set forth.

13. An oil-tank having its iron-pipe connections combined with coils of copper rods wound around said pipes, for the purposes set forth, and having their ends extending below the surface of the ground to a point of permanent moisture, substantially as described.

14. An oil-tank having a loose wooden frame upon its top, a tube stepped in said frame, an insulator with or without a flexible packing, and a lightning-rod point attached to said insulator, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of April, 1881.

W. P. NEWHALL.

Witnesses:
THOMAS KERVIN,
F. H. GARDNER.