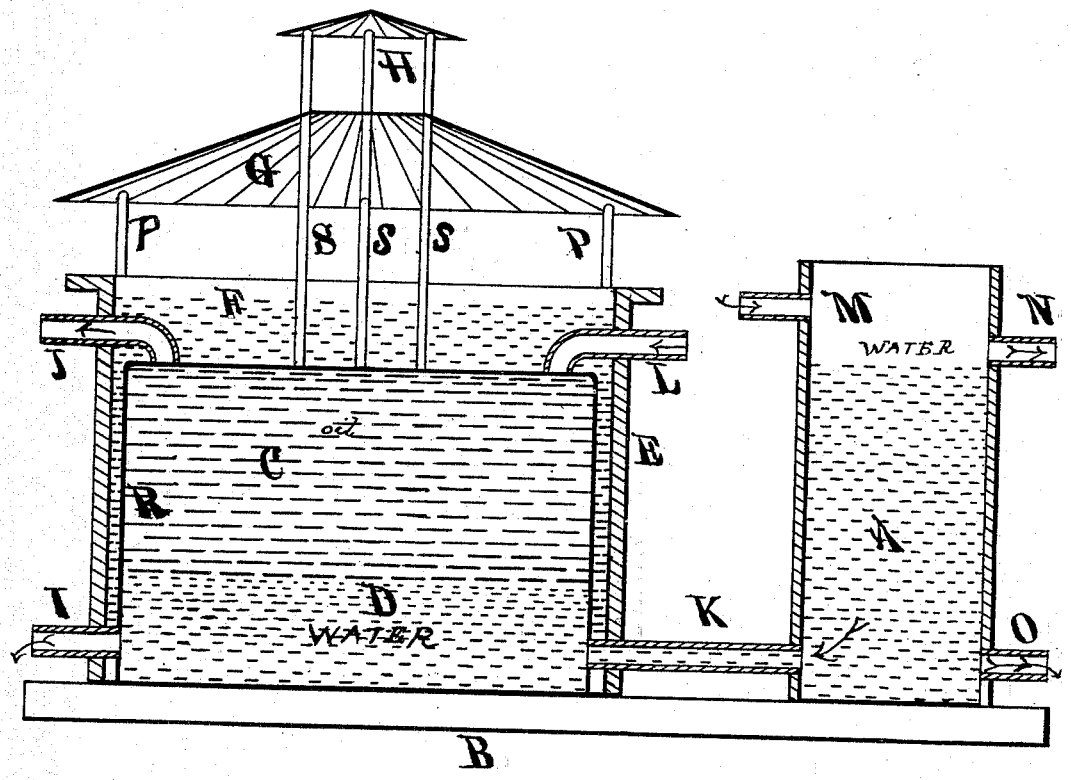
T. SHAW.

OIL-TANKS.

No. 194,847. Patented Sept. 4, 1877.



WITNESSES:

Elias J. Shaw

Wm B. Hughes

Thomas Shaw INVENTOR

ATTORNEY

UNITED STATES PATENT OFFICE.

THOMAS SHAW, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN OIL-TANKS.

Specification forming part of Letters Patent No. **194,847**, dated September 4, 1877; application filed May 12, 1877.

To all whom it may concern:

Be it known that I, THOMAS SHAW, of the city and county of Philadelphia, Pennsylvania, have invented a new and improved construction and arrangement of oil-tanks to prevent ignition of the oil contained therein by lightning; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in the arrangement of tanks in such a manner as to insure a tank full of liquid, and in the provision of water-chambers and passage-ways, all for the purpose as hereinafter described.

The object of the invention is to prevent the accumulation of vapors arising from the oils, and to prevent the generation of oil vapors in hot weather, as hereinafter described.

Oil vapors, with the proper admixture of air, will ignite spontaneously at temperatures long before heat becomes visible; in fact, the feeble blue electric spark (invisible in daylight and so low in temperature that it is received on the finger with no more sensation than that produced by a single thread of a spider's web) is competent to ignite the same at every emission of the spark. All masses of material, however feeble their conducting power, serve as a medium for electrical communication, and if any portion be partially insulated, electric sparks more or less powerful are induced, and if any ignitible vapor be in its path, combustion and possible explosion is certain. It is not necessary for a thunderbolt to strike an oil-tank to ignite its contents. Any highly-charged electrical cloud passing over the tank may induce a sufficient spark for the ignition of any combustible vapors, or a thunderbolt may strike the ground miles distant, and the electric discharge be conveyed by means of the piping or other metallic substances leading to or from tank. Large exposure of metallic surfaces offer sure protection from the violent force of a thunderbolt, by reason of the extended metallic surface diffusing the electrical fluid; but there will be feeble sparks emitted in abundance, and any one of them is competent to create a disaster by igniting oil vapors; and it is on this theory that the present invention is designed, the entire object being the prevention of generation and accumulation of combustible vapors or gases, and that object is effected by so arranging the oil-tank as to keep it always full of liquid, in which case there is no space for vapors or gases to accumulate in.

In order to enable others to use and practice my invention, I will proceed to describe its construction and operation.

On reference to the accompanying drawing, which forms part of the specification, B represents a foundation for the support of the tanks, of which R is a cylinder-tank, closed top and bottom for containing oil and water; and E is a cylinder-tank surrounding tank R, and is open at the top for retaining water above the top of tank R and for constructing a water-space between the walls of tank R and tank E. A is a tank of much smaller dimensions, for containing water. L is a pipe for feeding oil into tank R; and J is a pipe for conveying oil from said tank, and I is a pipe for draining tank R of all its contents whenever desirable. K is a pipe for conveying water from tank A to tank R, and M is a feed-pipe for feeding tank A with water from any source. N is an overflow-pipe for conveying any surplus of water off. O is a pipe for draining tank A of its contents whenever found necessary.

All the pipes and passage-ways are to be provided with ordinary stop-cocks for controlling the same.

The cylinder-tanks R and E are secured together firmly by ordinary stay-bolts whenever the tanks have magnitude sufficient to require the same.

G is a metallic roof, constructed in any firm manner, and is supported on short columns P, secured to top of tank E, and is provided with opening in center for ventilation, which opening is roofed at H, the roof being supported on rods S, which rods are firmly attached to roof G and reach down and are firmly secured to top of tank R, giving support against collapsing of top of said tank R, and secure the whole in a firm manner.

The roof is not necessary for the proper

protection or working of the tank, but the tank is rendered more complete by its addition.

The operation is in this wise: C represents oil, and D water, in tank R. The pipe K connecting the oil with the water-tank, and the water-tank having a slightly-increased elevation of head of water, insure a full supply of water to oil-tank so long as water is supplied to water-tank, by pipe M, and the pipes I and O are closed by ordinary valves attached to same. Any oil C drawn off from tank R through pipe J will be followed immediately by a flow of water from tank A, through pipe K, into tank R, and will settle at bottom of tank by reason of superior gravity, and will gradually rise like an immense piston, forcing the oil out above it, so long as the oil is permitted to flow, until all the oil be forced out, if desired, in which case the tank will be filled with water. But when oil is permitted to flow into oil-tank through pipe L, or any suitable inlet-pipe, the oil floats above and upon the water, and gradually forces the water from tank R into tank A. Any surplus of water in tank A overflows and is led off by pipe N, and this operation can continue until the water in tank R is entirely displaced by oil; and these operations can both be continued at the same time or alternated with a certainty of always maintaining a full tank of liquid in oil-tank R, which will prevent the accumulation of oil vapors that are liable to electric ignition, and is the prime object of the invention.

In extremely hot weather oil-tanks exposed to the direct rays of the sun are liable to have the light oil contained therein converted into vapor of considerable tension. On this account the water-tank E is provided, which affords a water-space between tanks E and R, and confines a bed of water, F, above tank R, and exposes a large surface of water for evaporation, which lowers the temperature and interposes a medium between the oil-tank and the exterior that renders it proof against violent thunderbolts, and forbids the passing of all electric sparks by the maintenance of a liquid contact with all the inner metallic surfaces.

It will be seen that I employ two separate bodies of water, one to submerge the oil-tank and prevent the conduction of heat, electricity, or lightning to the oil-tank, or the generation of vapors; and the other body of water to elevate the oil and prevent there being space or opportunity for generation of vapors in the oil-tank.

All lightning-rods in this case are useless and unnecessary, as this construction of tank is practically lightning-proof.

What I claim, and desire to secure by Letters Patent, is—

In lightning-proof oil-tanks, the combination of the interior submerged oil and water tank R with the exterior water-tank E and the separate water-supply tank A, the tanks E and A having no direct connecting-conduit, each tank having suitable inlet and outlet passage-ways, arranged as and for the purpose set forth.

THOMAS SHAW.

Witnesses:
ELIAS J. SHAW,
WM. B. HUGHES.