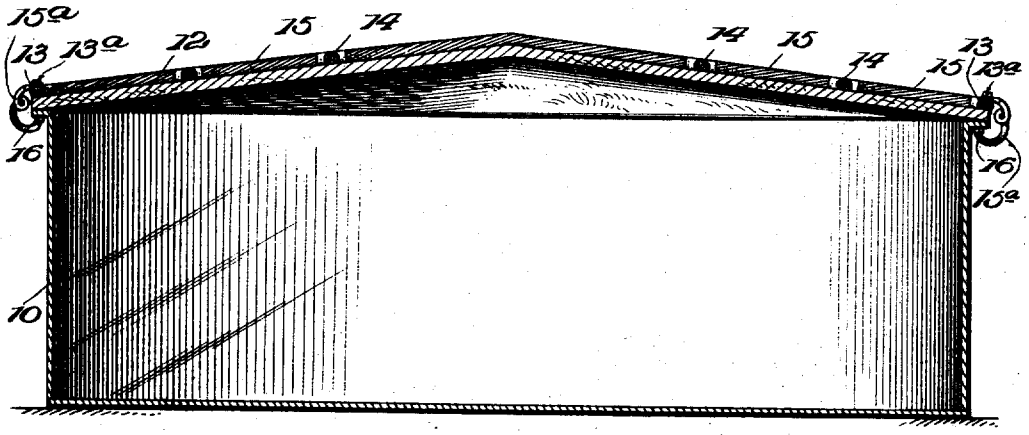
W. DODD.

LIGHTNING PROTECTOR.

APPLICATION FILED OCT. 23, 1917.

1,259,000. **Patented Mar. 12, 1918.**

Fig. 1.



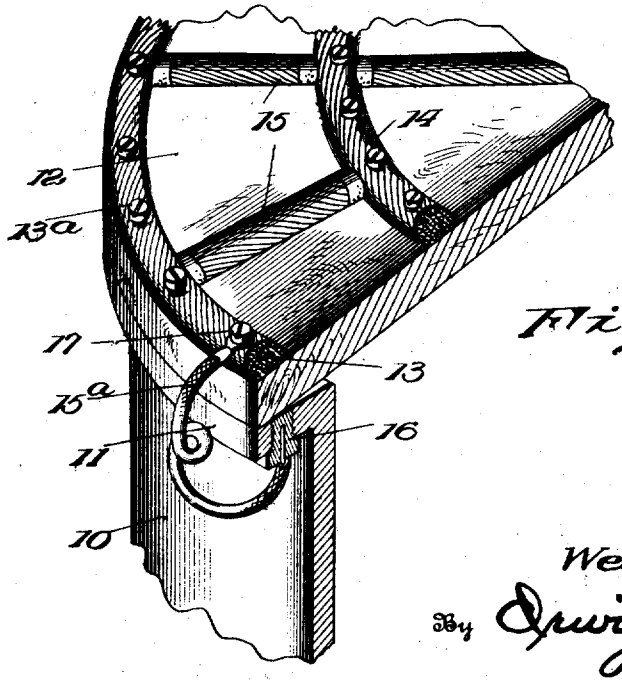


Fig. 2.

Inventor

West Dodd.

By Dwight Bair

his Attorneys

UNITED STATES PATENT OFFICE.

WEST DODD, OF DES MOINES, IOWA.

LIGHTNING-PROTECTOR.

1,259,000. Specification of Letters Patent. Patented Mar. 12, 1918.

Application filed October 23, 1917. Serial No. 198,073.

To all whom it may concern:

Be it known that I, WEST DODD, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Lightning-Protectors, of which the following is a specification.

At the present time there are large numbers of storage tanks for petroleum throughout the country, which tanks are constructed of metal body portions and wooden roofs. An alarmingly large number of such petroleum storage tanks are now being destroyed on account of electrical discharges usually occurring during thunder storms which cause sparks to pass between the wooden roof and the metal body and ignite the vapors arising from the petroleum in the tank.

The object of my invention is to provide means of simple and inexpensive construction for collecting and carrying off the static electrical charge from the wooden roof in such a manner as to prevent the possibility of the creation of sparks that might tend to ignite the said vapors.

My invention consists in the construction, arrangement and combination with a wooden roof of a charge collecting device located as closely as possible to that part of the roof adjacent to the top of the metal tank and in combining therewith suitable discharging devices arranged at intervals and forming electrical conductors between the collector on the roof and the body of the metal tank as hereinafter more fully set forth and illustrated in the accompanying drawing, in which:

Figure 1 shows a vertical central sectional view of a metallic tank and a wooden roof having my improvement applied thereto, and

Fig. 2 shows a detail sectional perspective view of a part of the top edge of the metal tank and a part of the wooden roof having my improved charged collecting device applied to the roof and the discharging device communicating between said collecting device and the metal tank.

Referring to the accompanying drawing, I have used the reference numeral 10 to indicate the body portion of the metal tank. These tanks are usually made of metal sheets united at their edges by rivets. At the top edge is the usual outwardly extending flange formed integral with the top plates and indicated by the numeral 11.

The wooden roof is indicated by the reference numeral 12 and is of the ordinary construction. Its outer edge or periphery rests upon the metal flange 11.

For the purpose of collecting an electric charge upon the wooden roof, I have provided a collecting device preferably made of copper cable indicated generally by the numeral 13. This copper cable is placed on the roof at a point as close as may be practicable to the edge of the roof adjacent the metal flange 11. In practice, I usually arrange this copper cable on the top surface of the roof at the outer edge thereof. The copper cable ordinarily has sufficient flexibility to lie flat upon the roof and to closely follow any irregularities in the top surface of the roof so as to be in actual physical contact with this top surface of the roof throughout its entire length completely surrounding the periphery of the roof. I preferably secure the collector cable to the roof at very frequent intervals by means of screws 13^a passed through the copper cable and into the wooden roof to thereby firmly hold the copper cable to its position in continuous physical contact with the roof surface.

I have in actual practice provided additional charge collecting cables. These have been arranged concentric with the collector at the periphery of the roof and spaced apart from it, such for instance as shown at 14 in the drawing. This inner cable or cables as the case may be, I electrically connect to the collector cable at the periphery by radially arranged collectors 15 electrically connected with the several circular charge collectors.

I have provided for discharging the charge delivered to the collector cables as follows:

Secured to the collector cable at the periphery of the roof at suitable intervals are the discharging conductors 15^a, the lower ends of which are electrically connected with the top edge of the metal tank. In practice, I usually accomplish this by screwing copper or brass bolts 16 into the flange 11 and brazing the discharging cables into said copper or brass bolts 16 which are threaded and screwed in the flange. The

discharging cables may be connected electrically and mechanically to the collecting cables by means of screws 17 passing through both cables where they overlap and into the wooden roof.

During certain atmospheric conditions which occur during thunder storms, the metal tanks become heavily charged with electricity and at the same time, the wooden roofs become equally charged with electricity. The petroleum in the tanks is constantly giving off vapor which is readily ignitible and this vapor is constantly discharging from the metal tanks through the narrow spaces which occur between the metal tank and the wooden roof so that an almost imperceptible electric spark passing between the wooden roof and the metal tank is sufficient at times to ignite the vapor and set fire to the petroleum in the tank resulting in the complete destruction of the tank, the cover and its contents. Many instances have occurred in which such tanks were ignited and burnt when the nearest lightning discharge was miles away from the tank. When a lightning flash occurs within the area that is electrically affected by the lightning flash, the electric charge stored in a metallic tank that is within this area is instantly discharged into the earth, but the electric charge in the wooden roof cannot pass off as rapidly as the charge contained in the metal tank due to the fact that the wooden roof itself is a poor conductor. This sudden discharge of the tank instantly creates a great difference in potential between the electric charge contained on the roof and that of the metal tank itself and at once sets up a condition in which the now free charge contained on the roof seeking to pass along the lines of least resistance to the metal tank arcs across the spaces between the roof and metal tank and thus forms sparks tending to ignite the vapors arising from the petroleum. By means of my improvement, I have provided means whereby the electric charge on the wooden roof is prevented from arcing across the space between the wooden roof and the metal tank. It is only that part of the charge on the roof that is near the periphery of the roof that is likely to spark across the gap to the metal tank. By my improvement, the charge collector that is arranged at the periphery of the roof and in close physical contact with the periphery of the roof causes all of the charge in its immediate neighborhood to enter the collector cable. This collector cable being made of copper and having high electrical conductivity, is of such nature that all of the charge collected by it will be instantly discharged to the metal tank without sparking at the instant the metal tank discharges to the ground.

It would be a matter of great difficulty and great expense to electrically connect a wooden roof at every point of its periphery with a metal tank. However, by my improvement, this is made unnecessary because of the fact that I have provided a means for collecting all of the charge at the periphery of the roof into a copper cable and after the charge is thus collected, it may discharge into the metal tank through copper cables arranged at intervals, thus completely protecting the tank against the formation of sparks which might tend to ignite the vapors with a minimum amount of conductor cables that may be very conveniently and easily applied to the existing metal tanks with wooden roofs. I have found in actual practice that it is not convenient to place the collector cable 13 on the edge or periphery of the wooden roof. I therefore place it on the relatively flat top surface of the wooden roof as near as possible to the edge and when this is done, I have found through laboratory experiments that a spark across the edge to the tank is impossible.

I claim as my invention:

The combination with a metallic storage tank, and a roof therefor having low electrical conductivity, of a collector of static electricity from the roof comprising a metallic conductor extended completely around the roof at its periphery and in continuous physical contact with the roof, and a discharger for said collector comprising a series of conductors electrically connected with the collector and with the metallic tank.

In testimony whereof I affix my signature in presence of two witnesses.

WEST DODD.

Witnesses:
LUCY B. MCCARTHY,
WALLACE A. DEANE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."