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STATIC CABLE SYSTEM FOR FUEL TANKS

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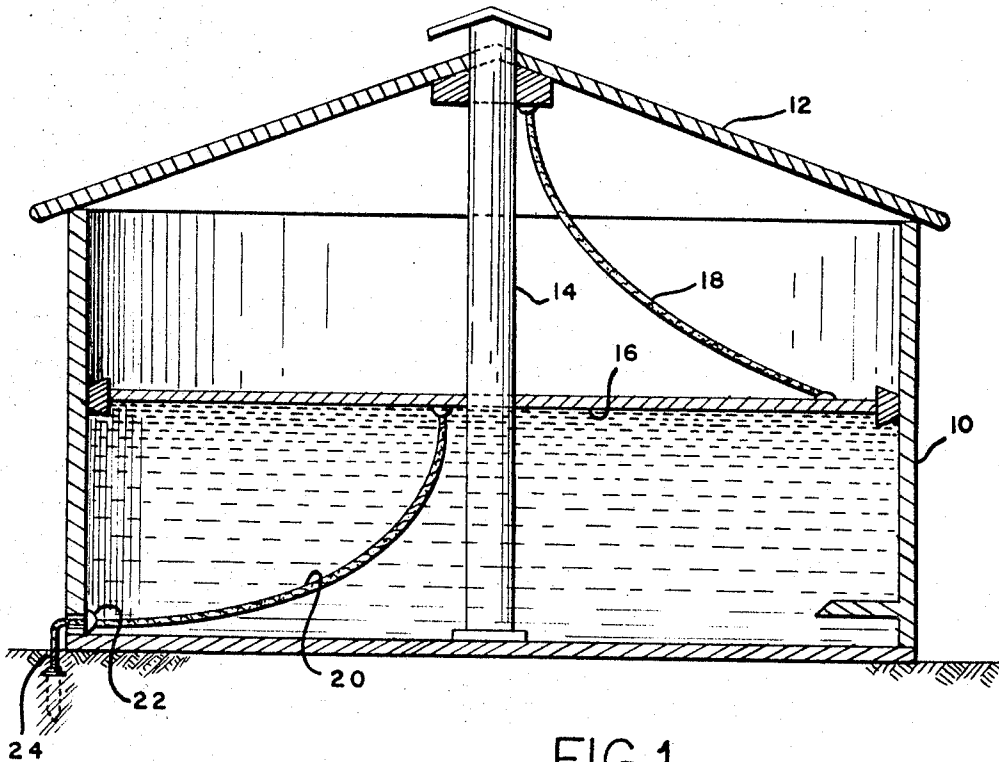


FIG. 1

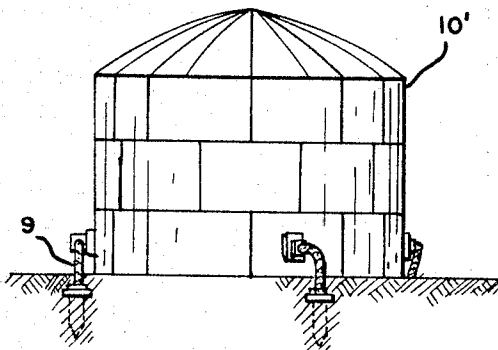


FIG. 2

PRIOR ART

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STATIC CABLE SYSTEM FOR FUEL TANKS

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2 Claims

ABSTRACT OF THE DISCLOSURE

Device for providing continuity from inner roof surface, whether floating or stationary, through any floating deck and to an outside ground. A static-eliminating cable is attached to the under surface of the roof of the fuel tank and to the upper surface of a floating diaphragm. A second cable, attached to the under wet surface of the diaphragm, leads through the tank wall in proximity to the base, and then to an earth ground.

Background of the invention

The present invention relates to a system of static cables for above-ground steel tanks, and more particularly to a system of flexible cables attached between the roof interior and a floating deck and between the underneath portion of a floating deck and an exterior ground.

Air Force and private industry have no standard method of maintaining electrical continuity for static electricity protection in above-ground welded steel tanks. The accidents, including loss of life and property, caused by electrostatic charge built up in fuel tanks is a matter of common knowledge.

Plans have been suggested such as shunt devices or grounding cables welded to the outside tank surface, but these have not been found to be universally satisfactory. Of special concern are coated tanks where these shunt devices and outside grounds do not operate effectively. There is also the matter of the elaborate precautions which have to be taken in the handling of fuel tanks and the manner of dress and the deportment of workers, operating around these devices.

Summary of the invention

The present invention provides a system of static cables for above-ground steel tanks, and more particularly to a system of flexible cables attached between the roof interior and a floating deck and between the underneath portion of a floating deck and an exterior ground, thus providing access of any charge present in any portion of a tank to a charge eliminating unit, and continuity from roof to ground.

The object of the invention is the provision of a device which reduces the hazards of static electric charge in a very simple, thorough, and effective manner.

A further object of the invention is the maintenance of continuity throughout the tank's exterior and interior surfaces to earthen ground, regardless of the height of fluid within the tank, or the mobility of roof or diaphragm.

A further object of the invention is the provision of a system which will provide this continuity in tanks of varying design including one with floating roof, pontoon roof or floating pan type tanks with or without fixed roofs; and further for tanks whose exteriors and interiors are both coated and uncoated.

These and other advantages, features and objects of the invention will become more apparent from the following description taken in connection with the illustrative embodiment in the accompanying drawings.

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Description of the drawings

FIGURE 1 is a vertical sectional view through a fuel tank showing the system of the invention as installed; and FIGURE 2 shows an example of prior art devices.

Description of the preferred embodiment

FIGURE 2 shows one of the prior art devices. A grounding element 9 is welded to the exterior of a tank 10'.

Referring more in detail to the drawings, a tank 10 has a fixed cone roof 12, and a central roof support column 14. This specific design of tank is exemplary only. The variety of tank designs where the system of the invention can be used has been indicated above.

In the example shown, there are two steps in the continuity, one from roof 12 to the floating element 16, which is provided by a static cable 18 attached to the air space surfaces beneath the roof apex at the top of the column 14. The second step is performed by cable 20, attached to the wet undersurface of the diaphragm 16, carried through to the outside of the tank as shown at 22, and to an earthen ground 24.

Continuity from roof to ground is thus established and maintained.

The material of the cables 18 and 20 is optional. For example: corrosion resistant, carbon steel flexible cable, coated or uncoated, and with diameter of the order of $\frac{3}{32}$ " to $\frac{3}{16}$ ". These cables may be bare or coated with materials which are impervious to hydrocarbon fuels, such as polyurethane. They must be flexible and of a length so that they are free to move with a floating roof, a pontoon roof or with the diaphragm, such as 16, of a floating pan type tank, with or without a fixed roof.

The system is usable and effective also during transportation. The ground 24 may be effectively attached to a grounding element of a movable tank car.

Although the invention has been described with reference to particular embodiments, it will be understood to those skilled in the art that the invention is capable of a variety of alternative embodiments within the spirit and scope of the appended claims. For example, the static cables may be secured in any conventional manner to standard steel connectors welded to the roof or floating pan. The only requirement is that the cables have freedom of movement from all hardware between the connectors.

What is claimed is:

1. A system for providing continuity grounding for preventing static build-up in liquid fuel tanks having metallic floating elements which follow liquid fuel level, said system comprising a flexible cable secured at one end to the roof element of a tank, and at its distal end to the upper surface of a floating element, a second cable secured in static conducting relationship at one end to the under surface of said floating element, the distal end of said second cable being carried through the tank wall and to a grounding element located on the outside of said tank.

2. A system for providing grounding for accumulating static charge in liquid fuel tanks, said system comprising a continuous grounding line from tank roof interior through metallic floating elements located interiorly of said tank, and through said tank wall to outside ground.

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