Nov. 15, 1932. C. H. HAUPT 1,888,079

STABILIZED FLOATING DECK

Filed May 29, 1931

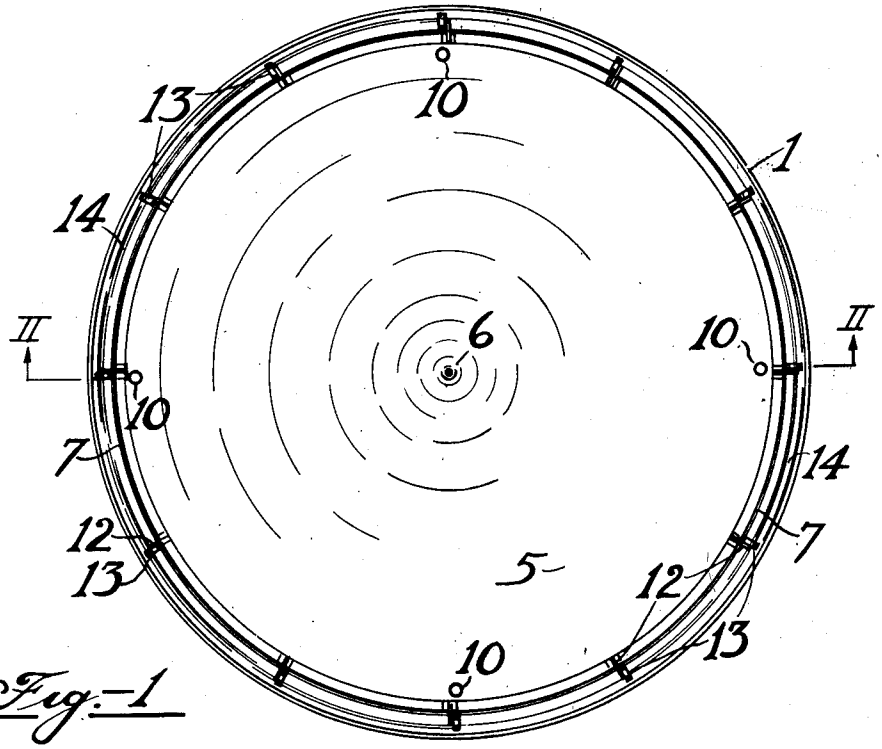


Fig.-1

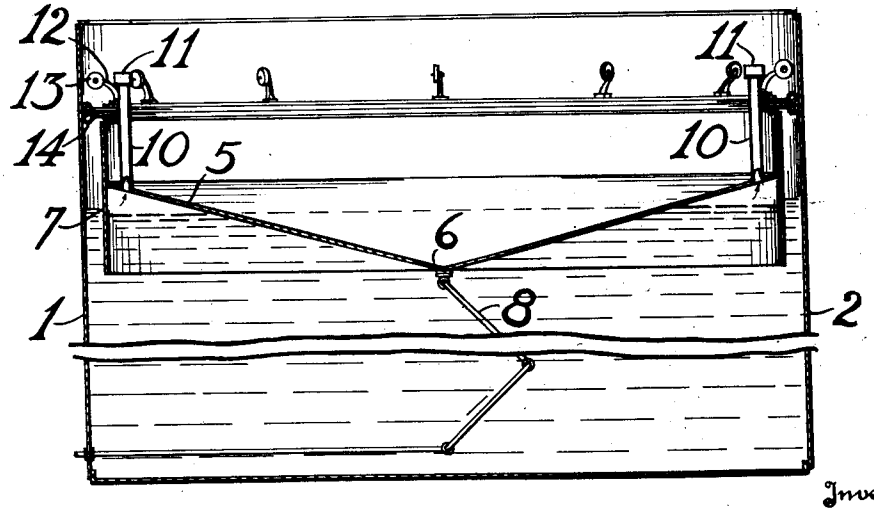


Fig.-2

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Patented Nov. 15, 1932 1,888,079

UNITED STATES PATENT OFFICE

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STABILIZED FLOATING DECK

Application filed May 29, 1931. Serial No. 540,929.

This invention relates to improvements in floating decks of the type adapted to rest upon a body of liquid in a tank. The invention will be fully understood from the following description taken in connection with the accompanying drawing in which latter—

Fig. 1 is a top plan view of a preferred form of floating deck disposed upon a body of liquid in a storage tank, and

Fig. 2 is a vertical transverse sectional view through the floating deck and tank, the deck being in its elevated position with respect to the body of liquid.

Referring to the drawing, reference numeral 1 designates a tank which may be of cylindrical form and which is adapted to contain liquid 2 such as oil, or the like. A floating deck or roof is disposed upon the surface of the liquid. The deck is of slightly less diameter than the diameter of the tank so that the deck can rise and fall as the level of the liquid in the tank varies. The floating deck rests horizontally upon the surface of the liquid.

The floating deck comprises a body portion or plate 5 having a portion of its bottom or under surface elevated above the remaining portion of the undersurface. The body portion inclines upwardly from a central portion 6 towards its peripheral edge. An annular baffle 7 projects downwardly from the plate 5 adjacent its peripheral edge into the liquid 2 a sufficient distance to prevent the escape of any vapors or gases accumulating between the surface of the liquid and the under surface of the plate 5. The baffle 7 and the bottom of the deck 8 form an annular pocket in which vapors are held under pressure, as will be described. Vaporization of a portion of the liquid in the tank results in the vapors being directed by the inclined under surface of the plate 5 upwardly to accumulate in an annular pocket. The accumulated vapors function to lift the deck in the liquid. The deck is therefore partially supported by the displaced liquid through the medium of the compressed vapor as well as by the buoyant effects of the portion of the deck which remains submerged in the liquid. This combined flotation effect may be referred to as a differential support since it varies with the pressure conditions in the tank; when the vapor pressure is highest the portion of the deck submerged in the liquid is least and vice versa. In other words, the relation between the area in contact with vapors and the area in contact with liquid is determined by the degree of immersion of the deck bottom in the liquid. The portion of the deck which is maintained in the liquid is proportioned to maintain the stability of the deck in its elevated position thereby maintaining the deck substantially horizontal. Any water or other material falling upon the upper surface of the deck is conducted by the downwardly inclining walls of the deck to its central portion, and as a consequence does not upset the stability of the deck. The water accumulating at the center of the deck can be withdrawn by a line 8.

The accumulation of vapor beneath the surface of the deck in amounts sufficient to raise the center of buoyancy so high as to upset the stability of the deck is prevented by vent pipes 10 opening from the elevated portion of the under surface of the deck at spaced intervals. Vent pipes 10 are each provided with a pressure vacuum valve 11. The vent pipes open through the under surface of the deck closely adjacent to the annular baffle.

The floating deck is guided in its up and down movement within the tank by means of arms 12 projecting from the baffle 7 and carrying guide rolls 13. Sealing means 14 of any suitable construction project radially outwardly from the annular baffle 7 to seal the space between the floating deck and the side walls of the tank.

By the construction described a floating deck is provided which will maintain its horizontal position under all conditions of vapor accumulation under the deck. This relieves the guide rolls and side walls of the tank of the strain caused by localized pressure if the floating deck were supported at an angle to the horizontal in the liquid. While the deck has been described as being of inverted cone shape, it will be understood that it can be provided with a convex under surface and some of the advantages of the invention will be retained.

