April 30, 1957 J. H. WIGGINS 2,790,575

SIDE WALL SHOE SUPPORTING MECHANISM FOR FLOATING TANK ROOFS

Filed April 18, 1955

FIG. 1.

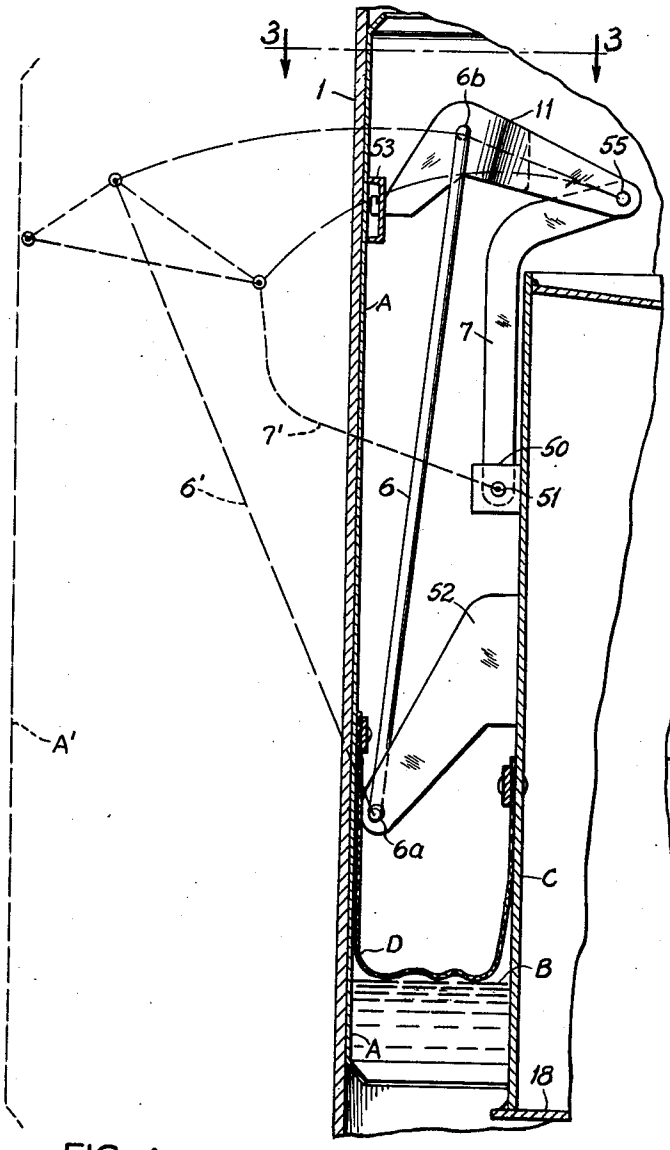


FIG. 2.

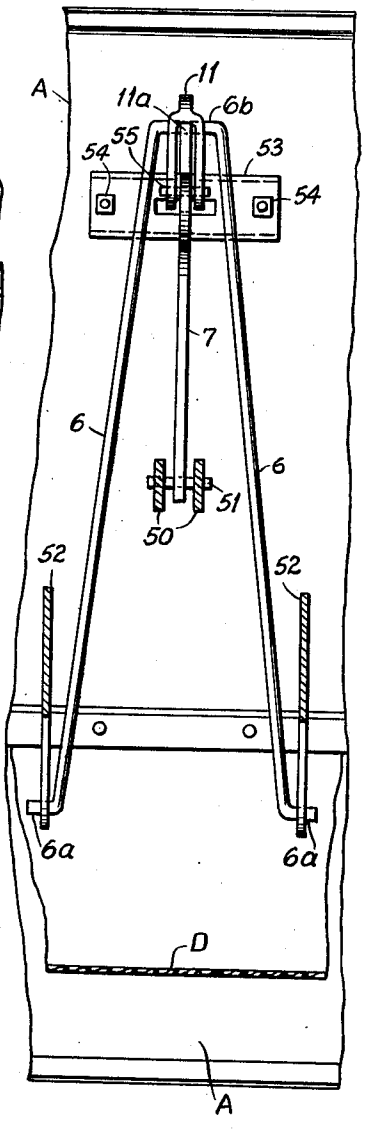


FIG. 4.

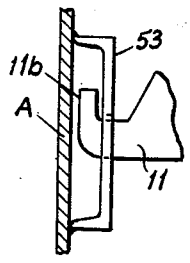
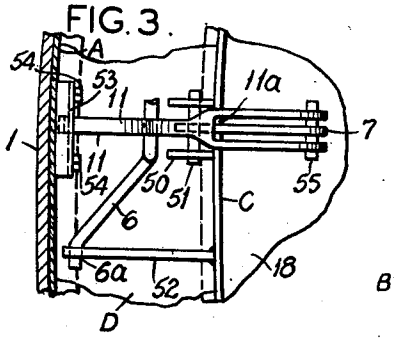


FIG. 3.



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SIDE WALL SHOE SUPPORTING MECHANISM FOR FLOATING TANK ROOFS

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Application April 18, 1955, Serial No. 501,877

4 Claims. (Cl. 220—26)

This application is a continuation in part of my pending application for patent Serial No. 334,006, filed January 19, 1953, now Patent No. 2,754,026.

This invention relates to a novel mechanism for mounting an annular side wall sealing shoe on a floating tank roof.

One object of my present invention is to provide a novel side wall shoe supporting mechanism whose coacting parts are of such design that the mechanism, as an entirety, is compact and small enough to enable it to be arranged in the space between the side wall shoe and the rim of the roof, and which is of such construction that the shoe remains at practically the same level as it moves radially, inwardly and outwardly, relatively to the rim of the roof.

Another object is to provide a side wall shoe supporting mechanism composed of a plurality of sets or pairs of rock arms mounted on the exterior of the rim of the roof and joined by links to the side wall shoe, each of said sets or pairs comprising two rock arms arranged in radial relationship with each other and constructed in such a manner that in all positions of the mechanism, the push or pull of the front and rear rock arms tends to balance the net outward thrust of the entire mechanism, due to the weight of the shoe.

Figure 1 of the drawings is a fragmentary, vertical, sectional view of a floating tank roof seal, equipped with a side wall shoe supporting mechanism embodying my invention, said mechanism being shown in side elevation.

Figure 2 is an elevational view at right angles to Figure 1 with the rim of the roof omitted and showing the inner face of the side wall shoe.

Figure 3 is a top plan view of the shoe supporting mechanism, said view being taken on the line 3—3 in Figure 1, looking in the direction indicated by the arrows, and

Figure 4 is a detail view illustrating how the links 11 are attached to the side wall shoe.

In the drawings 1 designates the circular side wall of an oil storage tank that is equipped with a floating roof 18 provided at its periphery with an upwardly projecting annular rim C which is arranged in spaced relation with the tank side wall. The means that is now generally used to seal the space between the tank side wall 1 and the rim C of the roof comprises a circumferentially flexible annular shoe A carried by the roof and arranged in sliding engagement with the tank side wall, and a fabric sealing element D of any preferred construction attached in any preferred manner to the side wall shoe and to the rim of the roof at a point above the surface B of the liquid on which the roof floats. My present invention consists of a novel supporting mechanism for the side wall shoe that is capable of being arranged between the side wall shoe and the rim of the roof, at a point above the fabric sealing element D.

Briefly described said shoe supporting mechanism is composed of a plurality of sets or pairs of rock arms 6 and 7 pivotally mounted on the exterior of the rim C

of the roof and having their upper ends joined by links 11 to the side wall shoe A, the links 11 being hinged or pivotally attached to the side wall shoe and projecting inwardly from same, and the two rock arms 6 and 7 of each pair or set of rock arms having their upper ends pivotally attached to the particular link 11 associated with said set or pair of arms. The rock arms 6 and 7 and the links 11 that are associated with said rock arms, are so designed and proportioned that they maintain the side wall shoe at a substantially constant level when said shoe moves radially, inwardly and outwardly, relatively to the roof, as shown in broken lines Figure 1. In the preferred form of my invention herein illustrated the arm 6 of each pair or set of rock arms consists of a relatively long, yoke shaped member arranged in an upright position with the lower ends of its two side portions provided with laterally projecting extensions 6^a that are rockably mounted in lugs or brackets 52 on the exterior of the rim C of the roof and with its closed upper end portion 6^b disposed horizontally so that it will serve as a pivotal connection between said arm 6 and the intermediate portion of the particular link 11 with which it is asociated. The arm 7 of each pair or set of rock arms, consists of a relatively short elbow shaped member whose vertical portion has its lower end pivotally attached by a pivot or pintle pin 51 to laterally projecting lugs 50 on the exterior of the rim C and whose angularly disposed upper end portion is pivotally attached by a pivot pin 55 to the inner end of the particular link 11 with which said rock arm is associated. As shown in Figure 1, the short arm 7 is mounted on the rim at a higher level than the point where the long arm 6 is mounted, with the result that the upper ends of the arms 6 and 7 are attached to the link 11 at about the same elevation. The link 11 that cooperates with each set or pair of rock arms 6 and 7 is arranged in a substantially horizontal position and is provided at its inner end or right hand end with a forked or bifurcated portion 11^a as shown in Figure 2, that loosely straddles or embraces the angularly disposed upper end portion of the particular rock arm 7 with which said link is associated, thereby making it possible for the inner end of the link 11 to move sidewise or circumferentially a slight distance, relatively to the rock arm 7. The outer end or left hand end of the link 11 is hinged or pivotally attached in any suitable manner to the side wall shoe A, as for example by means of a hook 11^b on the link that projects into a rectangular hole in a channel shaped member 53 which is secured to the side wall shoe by fastening devices 54.

The long arm 6 of each set or pair of rock arms is disposed in front of and in radial alignment with the short arm 7 of the set, and said two arms are so proportioned and arranged that when the side wall shoe is in close proximity to the tank rim as shown in full lines in Figure 1, said arms will be in a substantially vertical or upright position and with the angularly disposed upper end portion of the short arm 7 extending inwardly over the top edge of the rim on the roof. When the side wall shoe moves outwardly away from the roof rim, the plurality of sets or pairs of rock arms 6 and 7 located around the circumference of the roof rim C, maintain the side wall shoe at nearly the same level said shoe occupied when it was located in close proximity to the rim, and in all positions of the mechanism, inwardly and outwardly, the push or pull of the front and rear rock arms tends to balance the net outward thrust of the entire mechanism, due to the weight of the side wall shoe.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a liquid storage tank having an upstanding substantially cylindrical side wall, a substantially cylindrical

shoe in intimate sliding engagement with the inner surface of the side wall, and a floating roof within the tank having its perimeter defined by an upstanding peripheral rim spaced radially inwardly of the shoe, means on said roof for supporting said shoe so as to permit relative radial movement between the shoe and the roof while maintaining said shoe at reasonably constant level with respect to the roof, comprising a pair of rock arms of different length extending upwardly in the space between said shoe and said rim of said roof, the respective lowermost ends of said rock arms being pivotally attached to said rim at different levels below its upper edge, and a radially extending link pivotally attached to and interconnecting the upper end portions of said arms and having its outer end pivotally attached to said shoe, said arms and said link serving to uspport said shoe and being adapted to move radially inwardly and outwardly with respect to said roof to permit corresponding relative movement of said shoe.

2. The combination set forth in claim 1, wherein the lowermost end of the longer one of said arms is pivotally

attached to said rim at a level below the lowermost end of the shorter one of said arms.

3. The combination set forth in claim 1, wherein the lowermost end of the longer one of said arms is pivotally attached to said rim at a level below the lowermost end of the shorter one of said arms, and wherein the upper end portion of said longer arm is pivotally secured to said link between said shoe and the point of attachment of the shorter of said arms to said link.

4. The combination set forth in claim 3, wherein said shorter one of said arms is elbow shaped and its upper end portion and the inner end of said link are adapted to overhang said roof when the space between said shoe and said roof at the location of said link is at a minimum.

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