Feb. 17, 1948. J. W. ALLEN 2,436,348

LIFTER ROOF

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Fig. 1.

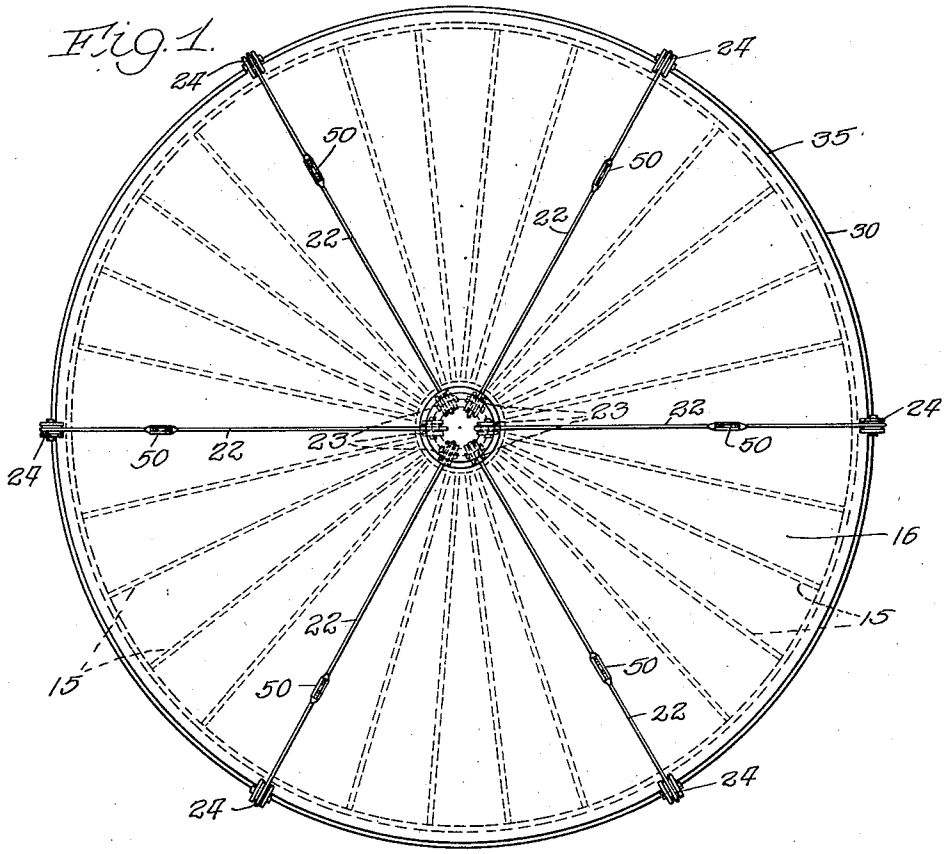
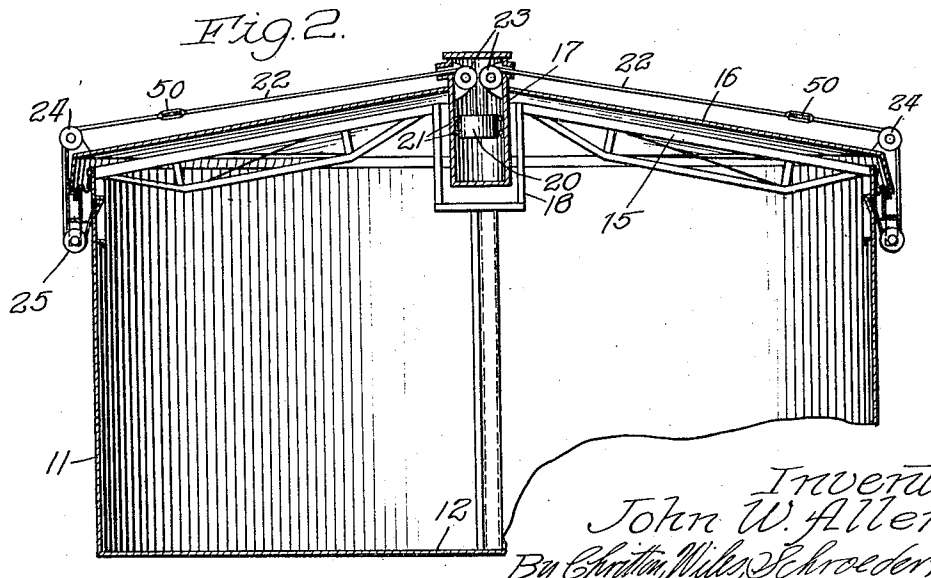


Fig. 2.



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Fig. 3.

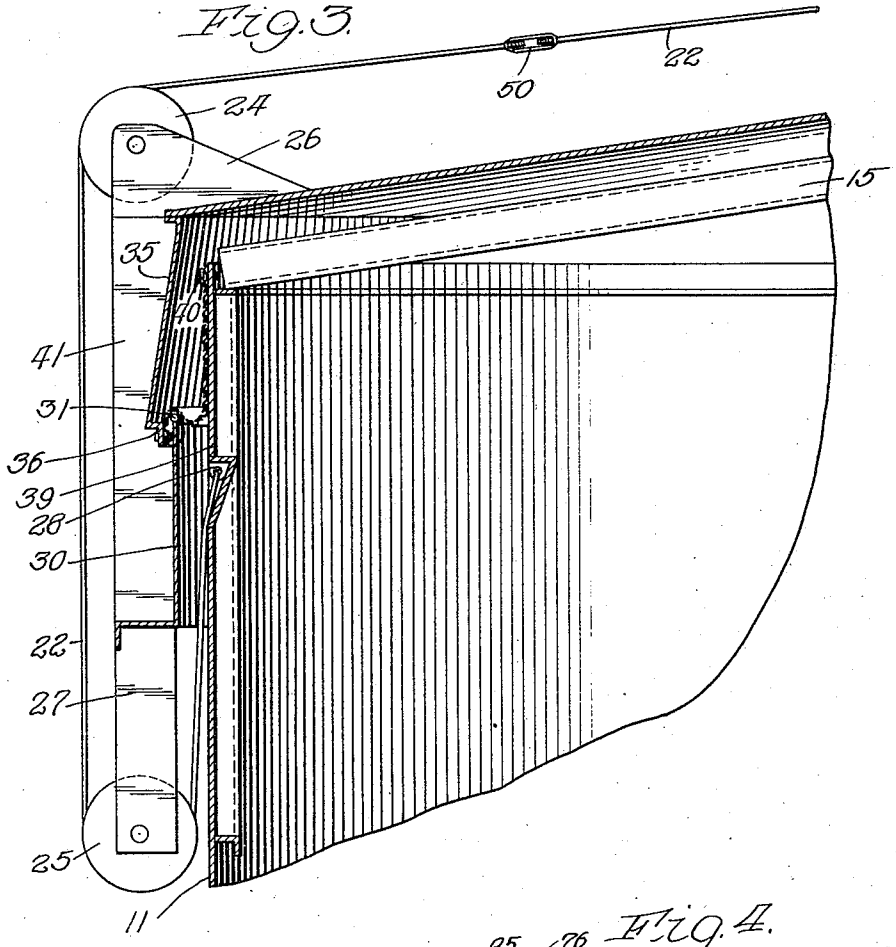
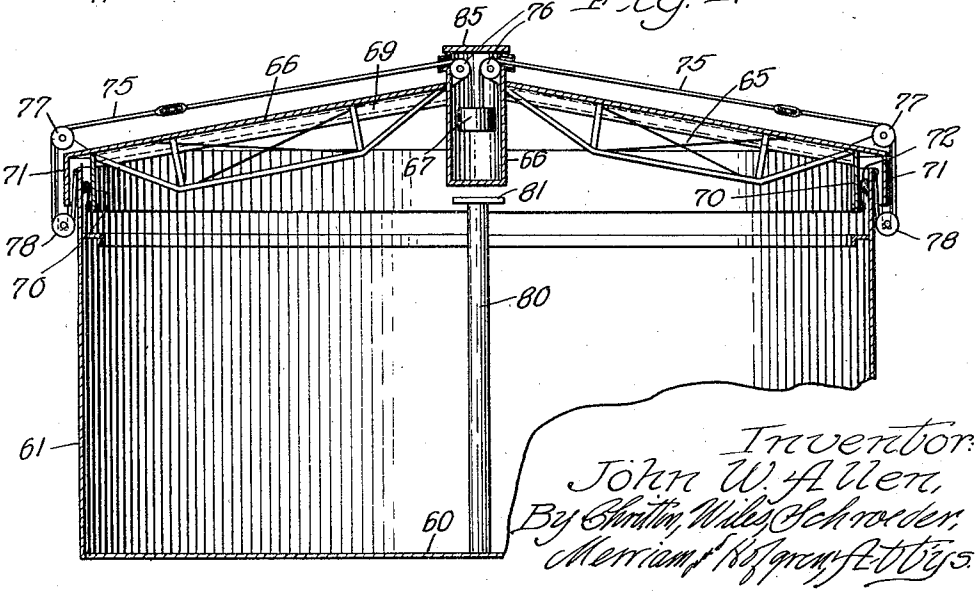


Fig. 4.



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UNITED STATES PATENT OFFICE

2,436,348

LIFTER ROOF

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Application November 3, 1945, Serial No. 626,586

8 Claims. (Cl. 48—176)

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This invention relates to a lifter roof and more particularly to a means for counterweighting the roof in such a way that the weight of the roof is constant.

The invention is illustrated in the drawings in which,

Fig. 1 is a plan view of a vessel embodying the improvement;

Fig. 2 is a sectional side elevation thereof;

Fig. 3 is a fragmentary side elevation enlarged to show the details of the sheave mechanism; and

Fig. 4 is a sectional elevation illustrating a modified form of the invention.

As shown in the drawing, 10 represents a storage vessel having side walls 11 and a bottom 12. 15 represents a lifter roof assembly. This assembly comprises a coned roof 16 truncated at its center to provide a well 17 secured to the roof in a gas tight manner. Frame 18 supports the roof and the well when the roof is in its lowermost position.

The counterweight 20 is suspended within the well and guided therein by any suitable means such as the wheels 21. The counterweight is carried by a plurality of cables 22 over a corresponding number of radially arranged sheaves 23, 24 and 25 in sequence, and the cables are then secured in recesses 28 within the side wall of the tank and near the top thereof.

Sheaves 24 are mounted in brackets 26 carried by the roof and are in fixed relationship thereto. Sheaves 25 are carried by the arm 27, secured to the depending skirt 30. The skirt 30 carries a rounded guard 31 at its top.

The roof is provided with an outwardly flaring depending skirt 35 having an angle iron rim 36 at its bottom to which the fabric seal 39 is secured. The seal is also secured at 40 to the top of the side wall.

Arms 27 are curved and are fastened to the roof.

It will be observed that as the roof rises the counterweight remains stationary with respect to the ground and at the same time the skirt 30 rises at the same rate as the roof and thereby provides backing for the fabric 39 when the skirt 35 has cleared the top edge 40 of the tank. A turn buckle 50 may be provided in each of the cables to adjust the length thereof.

In the form shown in Fig. 4, the vessel 60 is provided with side walls 61. The roof 65 is provided with a cone deck 68 carrying a central well 66 within which the counterweight 67 is housed. The deck 68 is stiffened by rafters 69 and carries two cencentric depending rims or skirts 70 and

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71. One of these rims is of smaller diameter than the walls of the storage vessel and the other rim 71 is of greater diameter. A flexible sealing member 72 is secured to the bottom of the inner rim 70 and to the side walls 61 at a point somewhat below the top. The counterweight is carried by cables 75 which pass over sheaves 76, 77 and 78 and are attached to the top of the side wall.

A center column 80, having a flat form 81 at its top, provides a stop for the well when the roof is in its lowermost position.

A weather hood 85 is provided over the center well.

In this form of the invention it will be observed that the flexible member 72 is backed up at times by the rim 70, at other times by the top of the walls 61, and at other times by the rim 71, or by a combination of these various elements.

Having described my invention as related to a typical embodiment of the same, it is my intention that the invention be not limited by the details of description unless otherwise specified, but rather be construed broadly within its spirit and scope as set forth in the accompanying claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a storage vessel having stationary side walls and a vertically movable roof, a flexible member connecting the side walls to the roof and a counterweight system carried by the roof including a central well in the roof and carried thereby, at least a pair of groups of sheaves in sequence carried by the roof, and flexible supporting means secured to the counterweight, each such supporting means passing over a group of the sheaves in sequence.

2. In a storage vessel having stationary side walls and a vertically movable roof, a flexible member connecting the side walls to the roof and a counterweight system carried by the roof including a central well in the roof and carried thereby, at least a pair of groups of sheaves in sequence carried by the roof, and flexible supporting means secured to the counterweight, each such supporting means passing over a group of the sheaves in sequence, said roof carrying a depending skirt at its edge.

3. A vessel as set forth in claim 2 in which the depending skirt is flared outwardly and downwardly.

4. A vessel as set forth in claim 2 in which the flexible member connects the bottom of the de-

pending skirt and the top of the side wall of the vessel.

5. A vessel as set forth in claim 1 in which independent supporting means are provided for the roof when it is in its lowermost position.

6. A vessel as set forth in claim 1 in which the roof is provided with a pair of concentric depending rims, one of smaller diameter than the tank and the other of larger diameter than the tank.

7. A vessel as set forth in claim 1 in which the roof is provided with a pair of concentric depending rims, one of smaller diameter than the tank and the other of larger diameter than the tank, and the flexible member is connected to the lower edge of the inner rim.

8. A vessel as set forth in claim 1 in which the roof is provided with a pair of concentric depending rims, one of smaller diameter than the tank and the other of larger diameter than the tank, and the flexible member is connected to the lower edge of the inner rim and to the side wall in a horizontal plane somewhat below the top edge thereof.

JOHN W. ALLEN.