July 22, 1958 C. H. SKINNER 2,844,169

HOSE BALLASTING MEANS

Filed Nov. 19, 1953

Fig. 1.

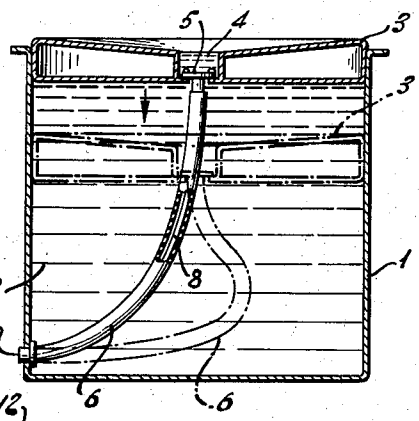


Fig. 2.

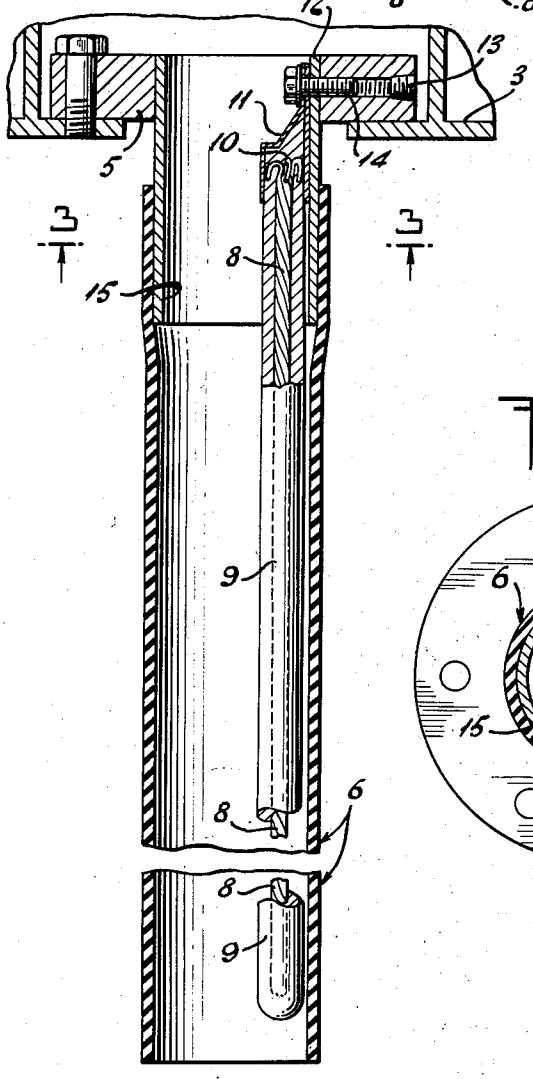


Fig. 4.

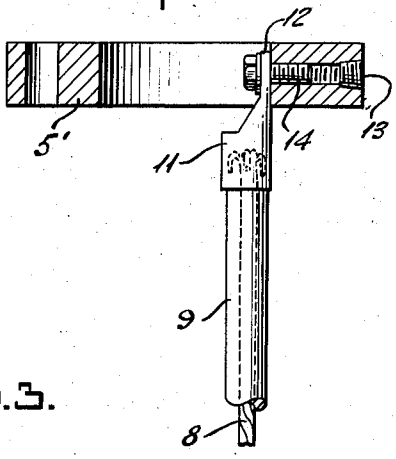
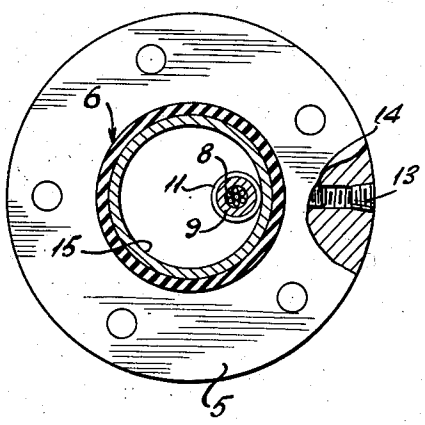


Fig. 3.



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HOSE BALLASTING MEANS

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1 Claim. (Cl. 138—25)

In various applications where a flexible hose line is required to be extended into, beneath or through a body of crude oil or other liquid, the buoyancy of the hose when empty is such that it tends to float; and, when liquid is passed through the hose, pocketed air tends to hold portions of the hose elevated and the hose distorted into sinuous form so that some of the liquid within the hose is trapped, instead of draining through the hose. One example of such an application is encountered in the draining of the floating roofs of large tanks such as are used for storing oils.

The object of the invention is to provide means for weighting or ballasting a hose line suitable for use in such applications, so as to overcome its tendency to float but without seriously impairing its flexibility and without resort to outside attachments which would present an irregular outside contour likely to be easily fouled on the so-called feet of the roof or other obstacles during movement of the hose.

For purposes of illustration, a preferred form of the invention is shown and will be described in the above-mentioned application to the drainage of a floating roof of an oil storage tank. It will be readily understood from the following description of the drawings in which:

Fig. 1 is a schematic vertical section of a floating roof type of storage tank with the hose of the present invention applied to it;

Fig. 2 is an enlarged, broken-out sectional view of the hose and ballasting means and their upper end mounting, the hose and ballasting means being shown depending in a normally straight, at rest position;

Fig. 3 is a cross section on the line 3—3 of Fig. 2; and

Fig. 4 is a section of a separate hose flange having a ballast element attached.

Referring first to Fig. 1, the tank **1** in which is stored a body of liquid **2** is provided with a floating roof **3**. The top of the roof is dished so as to drain rain water into a central sump **4**. Attached to the under side of the roof by the end flange **5** is a drainage hose, generally designated **6**, the other end of the hose being suitably coupled to a discharge outlet **7** adjacent the bottom of the tank.

As will be understood, the tank roof rises or falls as liquid is supplied to or withdrawn from the tank, the problem in this application being to ensure that even in the lower positions of the roof (as indicated by the dot-dash outline) the hose will sink in the liquid and maintain an uninterrupted discharge passage for the water draining from the sump. Kinking or distorting of the hose results in undue wear or damage and, of course, any drain water trapped in the hose is liable to freeze in low temperatures.

According to the present invention, a heavy, cable-like flexible ballasting element is located within the hose, free of any connection with it except at one end, where it is coupled to the hose end flange. In this preferred form the ballasting element consists of a multiple-strand steel cable **8** enclosed within a lead sheath **9**, the cable serving to render the element resilient as well as flexible and, as has been found, being very effective to prevent kinking without materially interfering with the coiling of the hose. The lead sheath is found to be adequate to sink the hose without requiring to be of such diameter as to unduly restrict its capacity. For example, the cross-sectional area of the ballasting element need be no more than about 10% of that of the interior of the hose. At its free end, the element terminates short of the end of the hose so as not to protrude when the hose is coiled or flexed.

In the preferred arrangement for attaching the ballasting element to the hose, the end of the sheath and the exposed and bent over cable ends **10** (Fig. 2) are leaded into a mounting lug having a hollow body portion **11** and a perforated end strip **12**. The hose end flange **5** is drilled radially and tapped to receive a plug **13** at its outer end and a lug-securing bolt **14** inserted from within the end of the hose. In the typical arrangement illustrated, the hose flange **5** is secured to the nipple **15** which carries the hose itself and the flange is bolted to the under side of the tank roof at the bottom of the sump.

As an attachment or accessory for existing installations, the ballasting element can be attached to a dummy hose flange **5'** (Fig. 4) differing from flange **5** only in that its internal diameter is approximately the same as that of nipple **15** rather than that of flange **5**. Thus the element can be slipped into the existing hose and the abutting flanges **5, 5'** both secured to the tank roof.

In the light of the foregoing description, the following is claimed:

A drain hose for a liquid tank roof having a well and adapted to extend from the well, within the tank liquid, to an outlet from the tank, comprising: the combination with a hose and flange of a normally straight, resilient, multiple-strand steel cable within the hose, a lug secured to one end of the cable and having a perforated end portion projecting beyond the cable end, and a bolt passing outwardly through said end portion and into the hose and flange to secure the said cable end thereto, the other end of the cable being free of any connection with the hose and the said cable being lead-sheathed to cause it to sink in the tank liquid.

References Cited in the file of this patent

UNITED STATES PATENTS

480,749	Stanley	Aug. 16, 1892
1,205,878	Fargo	Nov. 21, 1916
2,277,864	Horvath	Mar. 31, 1942
2,299,160	MacPherson	Oct. 20, 1942
2,332,940	Senke	Oct. 26, 1943
2,390,141	Wiggins	Dec. 4, 1945
2,560,853	Eickmeyer et al.	July 17, 1951
2,640,502	Powers	June 2, 1953