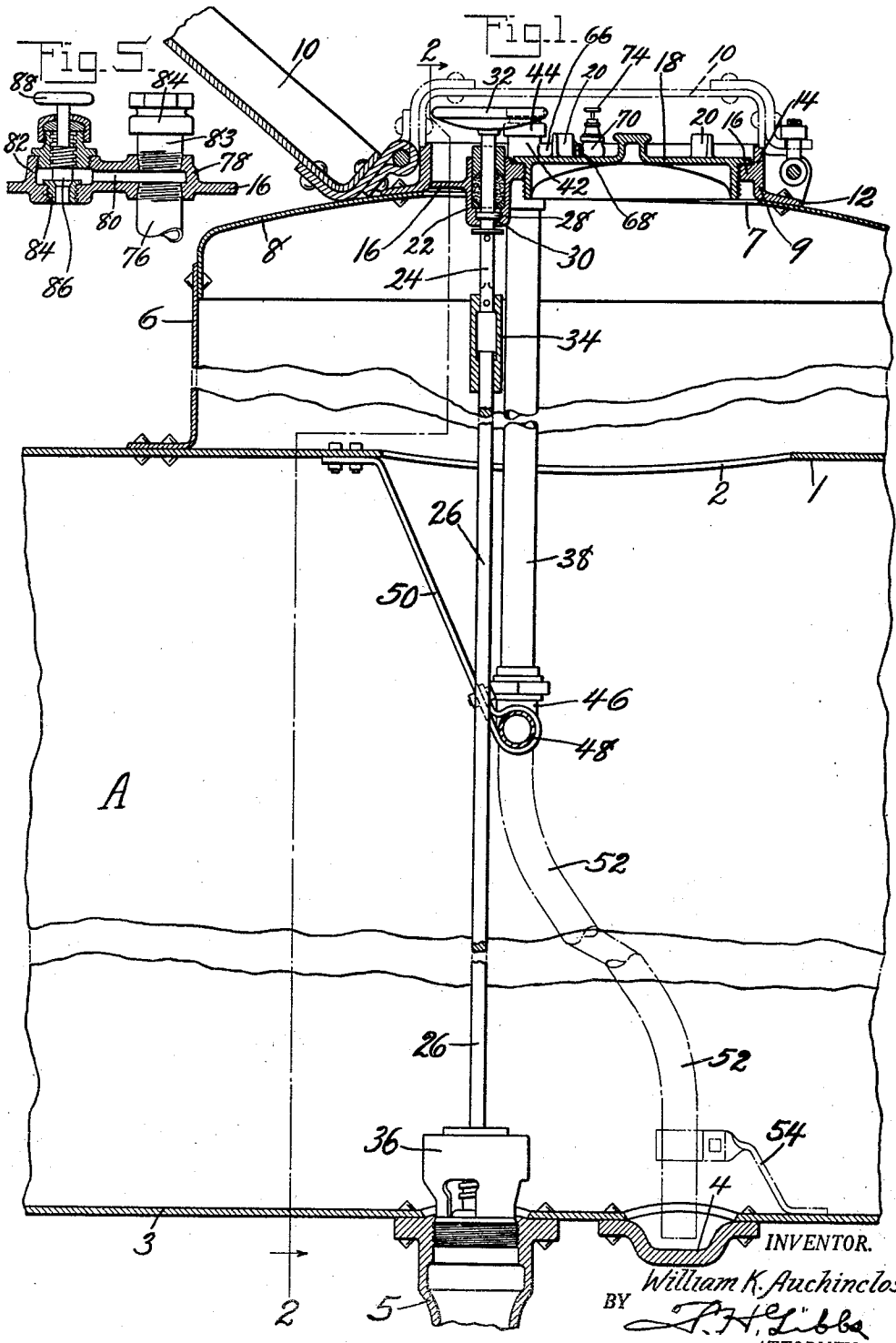
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TANK CAR DOME CLOSURE

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Fig. 2.

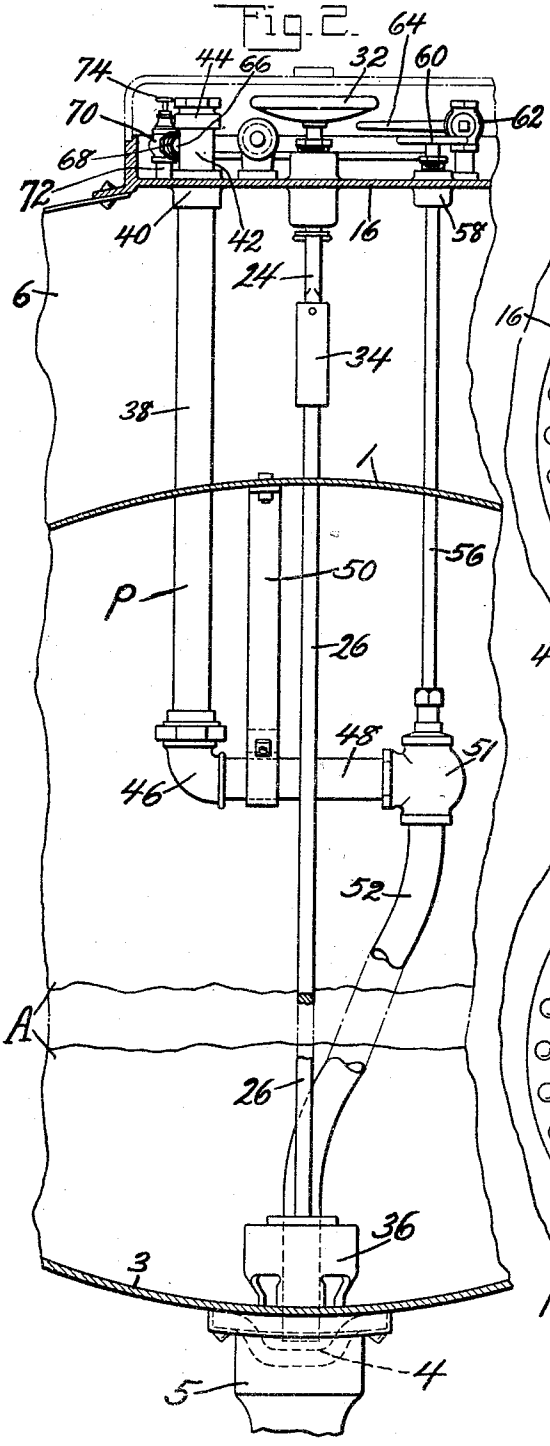


Fig. 3.

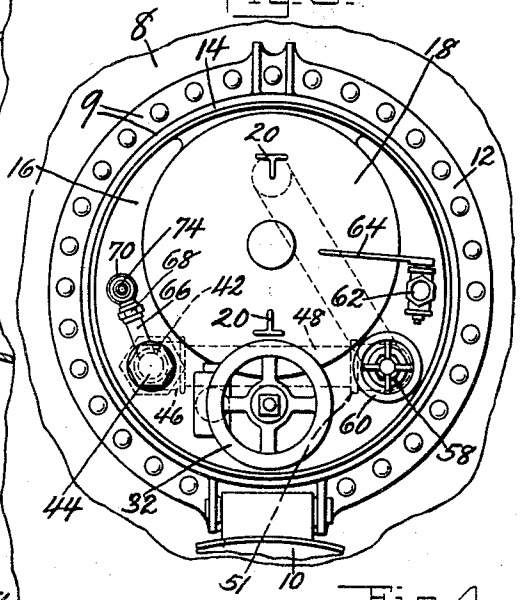
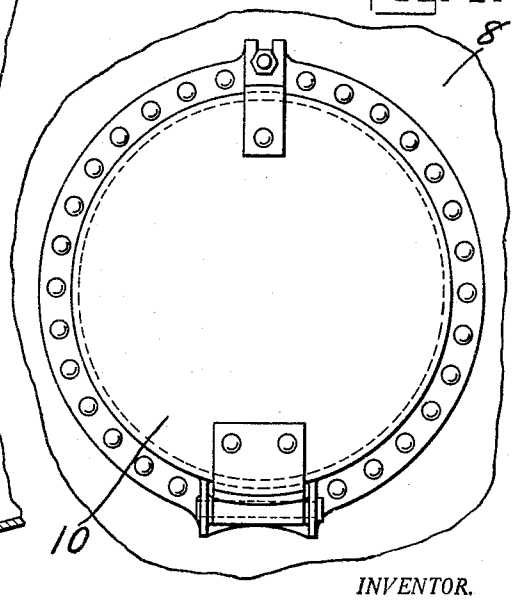


Fig. 4.



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UNITED STATES PATENT OFFICE

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TANK CAR DOME CLOSURE

Application filed December 9, 1930. Serial No. 501,037.

This invention relates generally to tank cars and has particular reference to closures for the domes of car tanks which will permit the loading, unloading, gauging and sampling of the tank without necessitating the opening thereof, thereby eliminating the danger necessarily incident to the escape of gas from the tank.

This application is a continuation in part of an application filed by me May 6th, 1927, on tank car dome closure and bearing Serial No. 189,329.

One object of this invention is the provision of a tank dome having a dome ring secured around the usual man-hole opening in the cap sheet of the dome, which dome ring is so formed as to support tank fittings.

Another object of this invention is the provision of a tank dome to which a dome ring is secured about a man-hole opening in the cap sheet of the dome, which dome ring is so formed as to support and carry tank fittings, and said dome ring is provided with a dome cover, which, when in normal position, conceals the tank fittings whereby to prevent unauthorized tampering therewith.

Still another object of the present invention is the provision of means for isolating a portion of the lading in a tank in such a manner that it is not subject to gas pressure developed within the tank whereby the lading may be sampled and accurately gauged while there is pressure within the tank.

This invention further contemplates means for establishing a column of tank lading in a car tank or the like, which column is normally subject to pressure developed within the tank and means for cutting off or isolating a portion of the tank lading in the column from the remainder of the lading and from the internal pressure within the tank whereby samples of the tank lading may be obtained while there is pressure within the tank; the said means in the present instance comprising a valve operative within the lading column.

A still further object of this invention is the provision of means providing for sampling and accurate gauging of the contents of a tank, which includes a pipe establishing a column of tank lading with valve means therein operative to closed position for the purpose of isolating a portion of the lading from the remainder of the lading and for relieving the isolated portion of internal tank pressure, together with valve controlled means effective for equalizing the pressure in the tank with the pressure in the isolated portion of the column of the tank lading.

A further object of this invention is the provision of a sampling and gauging means for the contents of car tanks which is normally concealed by a dome cover, but which permits the gauging and sampling of the tank contents without the necessity of opening the entire tank.

Other objects and advantages of this invention will be apparent from the following description taken in conjunction with the accompanying drawings in which

Figure 1 is a broken partial vertical longitudinal section of a railway car tank showing a portion of the dome and the present invention applied thereto.

Fig. 2 is a broken partial vertical transverse section of the structure shown in Fig. 1, the view being taken on the line 2—2, Fig. 1.

Fig. 3 is a top plan view showing the dome ring and its associated tank fittings; the view also showing a portion of the dome cover.

Fig. 4 is a top plan view of a portion of the tank dome showing the dome cover in closed position.

Fig. 5 is a detail sectional view showing a modification of one of the tank fittings.

Referring now more particularly to the drawings in which similar characters of reference designate similar parts in the several views, in Fig. 1 a portion of a car tank is shown generally at A and the same may be of any preferred or desired form and which is preferably adapted to be mounted on a car frame. The tank comprises a shell the upper portion of which is indicated at 1 and said shell is provided with a man-hole opening 2 and a bottom portion 3 having a sump 4 and a discharge nozzle 5. Secured to the upper portion of the shell 1 is a tank dome 6 provided with an opening 7 in the dome head

or cap sheet 8. Fixedly secured to the dome head 8 by suitable fasteners and surrounding the opening 7 therein is a dome ring 9 to which is hingedly secured a dome cover 10. The dome ring of the present invention comprises a casting having a laterally extending attaching flange 12 by which the ring is secured to the dome head, and an upright annular flange 14. The dome ring is provided with a web or flange 16 which forms, in effect, an inner dome cover and said web is provided with an eccentrically arranged opening which threadedly receives a closure element 18, in the form of a flanged cap, the latter being provided with spaced ears 20 to receive a suitable tool for loosening or tightening the cap, as will be apparent.

The web 16 is provided with a vertically arranged stuffing-box 22 through which the upper extension 24 of a valve rod 26 extends, said extension being provided with a collar 28 which is seated on an internal shoulder 30 formed in the stuffing-box. The upper end of said extension 24 is provided with a hand wheel 32 for operating the rod and from the lower end of the extension a sleeve 34 depends. As shown clearly in Fig. 1, the upper end of valve rod 26 extends into the above-mentioned sleeve 34 and the lower end of said rod 26 threadedly engages a valve 36 which controls the discharge through the above-mentioned nozzle 5. It will be apparent that operation of the hand wheel 32 will raise and lower the valve 36, thereby controlling discharge from the tank. During rotation of the hand wheel 32 the upper end of valve rod 26 will slide in the sleeve 34.

The present construction includes a top filling and discharge pipe indicated generally at P which also provides a means for the establishment of a column of tank lading whereby to permit sampling and accurate gauging of the tank lading, the pipe P comprising an upper or gauging and sampling portion 38 having its upper end threadedly engaged with the lower portion of a boss 40 formed with the web 16 and extending beyond both the upper and lower surfaces of the latter. Secured to the upper portion of boss 40 and extending vertically above the upper surface of the web 16 is a nipple 42 to which is threadedly secured a cap 44. The gauging and sampling pipe 38 is connected by an elbow 46 with a horizontally arranged branch pipe 48, supported by a hanger 50 depending from the top 1 of the tank and the end of branch pipe 48 is connected to a valve casing 51 from which a pipe 52 extends, the lower end of the latter being positioned in the sump 4. In practice, and to obtain proper operation of the present invention, the branch pipe 48 and the valve casing with its valve are positioned in the tank below the normal load line thereof for a purpose hereinafter described. In order to retain the pipe 52 in position, a bracket 54 is provided, which is secured to the inner surface of the bottom of the tank, as is clearly shown in Fig. 1 and which engages the pipe 52 adjacent the lower end of the latter. It is obvious that with the valve in the casing 51 in open position the pipe P and the lading therein is normally subject to any pressure developed within the tank.

For operating the valve arranged in casing 51, a valve rod 56 is provided which extends upwardly through a stuffing-box 58 and above the same and has a hand wheel 60 for operating purposes. The tank fittings also include an air inlet valve 62 provided with an operating handle 64.

In order to obtain an accurate gauging of the contents of the tank it is of course necessary to provide for equalizing the pressure between the pipe 38 and the liquid in the tank and to that end a means for equalizing the pressure has been provided, the same comprising a pipe 66 which, as clearly shown in Fig. 3, extends from a coupling 68 into the nipple 42. The pipe 66 is in communication with the interior of the tank and more specifically with the interior of the dome by means of a valve 70 connected to the coupling 68 and to a pipe 72 which communicates with the interior of the dome, as clearly shown in Fig. 2. The valve may be of any preferred or desired construction and is provided with an operating wheel 74.

Fig. 5 discloses a modification of the means for equalizing the pressure between the pipe 38 and the interior of the tank. In the construction shown in this Fig. 5 the pipe identified at 38 in Fig. 2, is indicated at 76, and extends into and communicates with the interior of a valve casing extension 78 cast integral with the web 16 of the dome ring. The extension 78 is substantially hollow to provide an air passage 80 which communicates with the interior of a valve casing 82 in which is secured a valve seat element 84. As shown clearly in this Fig. 5 the valve seat element 84 communicates with the interior of the dome and egress of air from the interior of the dome to the interior of the valve casing is prevented by a valve 86 which is adapted to be operated by the hand wheel 88. Extending upwardly from the valve casing extension 78 and arranged preferably opposite the end of pipe 76 is a nipple 83 which is normally closed by a cap 84.

The parts heretofore described as tank fittings are all supported by the web 16 of the dome ring and normally such fittings are concealed by the dome cover 10 which, in the instance shown, is hingedly secured to the dome ring as clearly shown in Fig. 1.

In order to obtain a sample of the tank lading it is only necessary to remove the cap 44 from the nipple 42. As will be obvious this can be done without danger of escaping gas as the valve in casing 51 need not be opened.

In order to accurately gauge the contents of the tank it is necessary to equalize the lading in the tank and in the pipe 38. To do this, the valve 51 is opened by means of the hand wheel 60 and the valve 70 by means of the hand wheel 74. It will be obvious that this will result in an equalization of pressure in the tank and the pipe 38 so that the load lines in the tank and pipe 38 respectively will be identical. The valve 70 and the valve in casing 51 are then closed whereupon the cap 44 is removed and the lading in pipe 38 may then be accurately gauged, and this occurs while there is pressure in the tank.

The tank of the present invention may be and preferably is filled with lading through pipes 38, 48 and 52 when the valve 36 is in closed position and while the valve 51 is in open position.

When the tank is filled to the desired level the air inlet valve 62 and the valve in casing 51 are closed, but it will be obvious that the pipe 38 will contain liquid up to the level of the liquid in the tank.

It is believed that the operation of the present invention will be fully apparent to those skilled in the art. The drawings disclose the preferred construction, but it is to be understood that they are for illustrative purposes only and various changes in the form and proportions of the constructions may be made within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

1. In a car tank, a filling and discharge pipe normally subject to pressure within the tank, a closure for the upper end of the pipe, a control valve intermediate the ends of the pipe below the normal load line of the tank operative to isolate a portion of the lading in the pipe from internal tank pressure whereby upon removal of the closure element the lading in said isolated portion may be sampled while there is pressure within the tank, and means for equalizing the pressure in the tank and the pipe containing the isolated portion of tank lading to permit gauging of the lading.

2. In a car tank, a filling and discharge pipe, a closure for the ingress end thereof, a control valve intermediate the ends of the pipe for isolating a portion of the contents of said pipe from the lading in the tank, and means for equalizing the pressure in the tank and the pipe containing the isolated portion of tank lading.

3. In a car tank, a filling and discharge pipe, a closure for the ingress end thereof, a control valve intermediate the ends of the pipe for isolating a portion of the contents of said pipe from the lading in the tank, and means for equalizing the pressure in the tank and the pipe containing the isolated portion of tank lading prior to removal of the closure means whereby the closure means may be subsequently removed to permit gauging and sampling of the tank lading in the isolated portion while there is pressure in the tank.

4. In a car tank, a filling and discharge pipe having a closure for the ingress end thereof, a control valve intermediate the ends of the pipe arranged below the normal load line of the tank for isolating the portion of the tank lading in said pipe between the ingress end and said valve from the remainder of the lading, and valve controlled means communicating with the interior of the tank and the pipe between the ingress end of the latter and said control valve for equalizing the pressure in the tank and said pipe.

5. In a car tank, a dome ring having an internal web provided with a manhole, a closure for the manhole, a filling and discharge pipe supported by the web and provided with a closure for the ingress end thereof, a control valve in the pipe below the normal load line of the tank adapted to isolate the portion of the lading in said pipe between the ingress end and said valve from the lading in the tank, and a valve controlled by-pass mounted on the web for establishing communication between the interior of the tank and the filling and discharge pipe to equalize the pressure in the tank and said pipe.

In witness whereof I have hereunto set my hand.

WILLIAM K. AUCHINCLOSS.