

May 14, 1929.

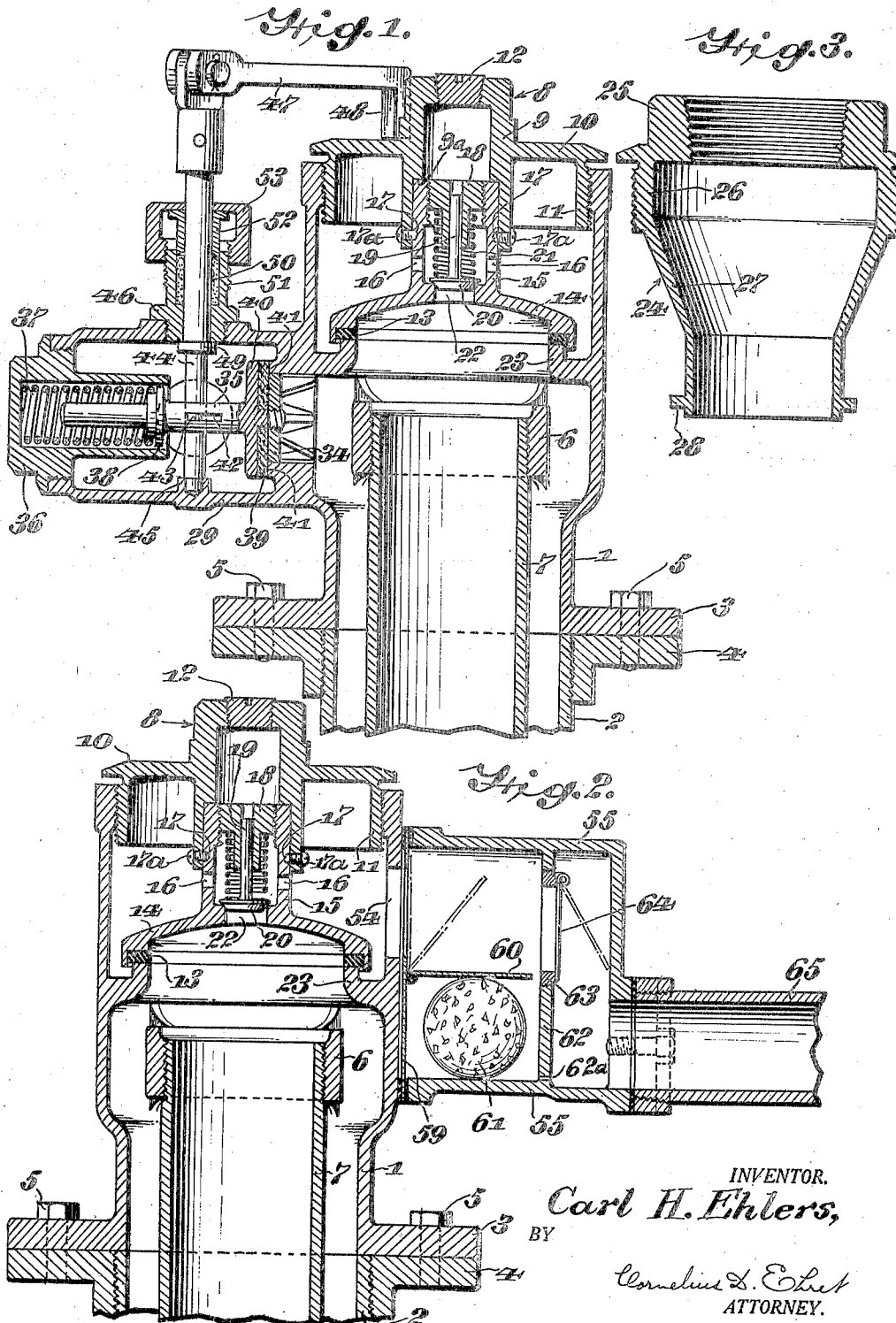
C. H. EHLERS

1,712,877

COMBINATION FILL, AIR VENT, AND RELIEF COUPLING

Filed Nov. 12, 1925

2 Sheets-Sheet 1



INVENTOR.
Carl H. Ehlers,

BY

Cornelius L. Ehlers
ATTORNEY.

May 14, 1929.

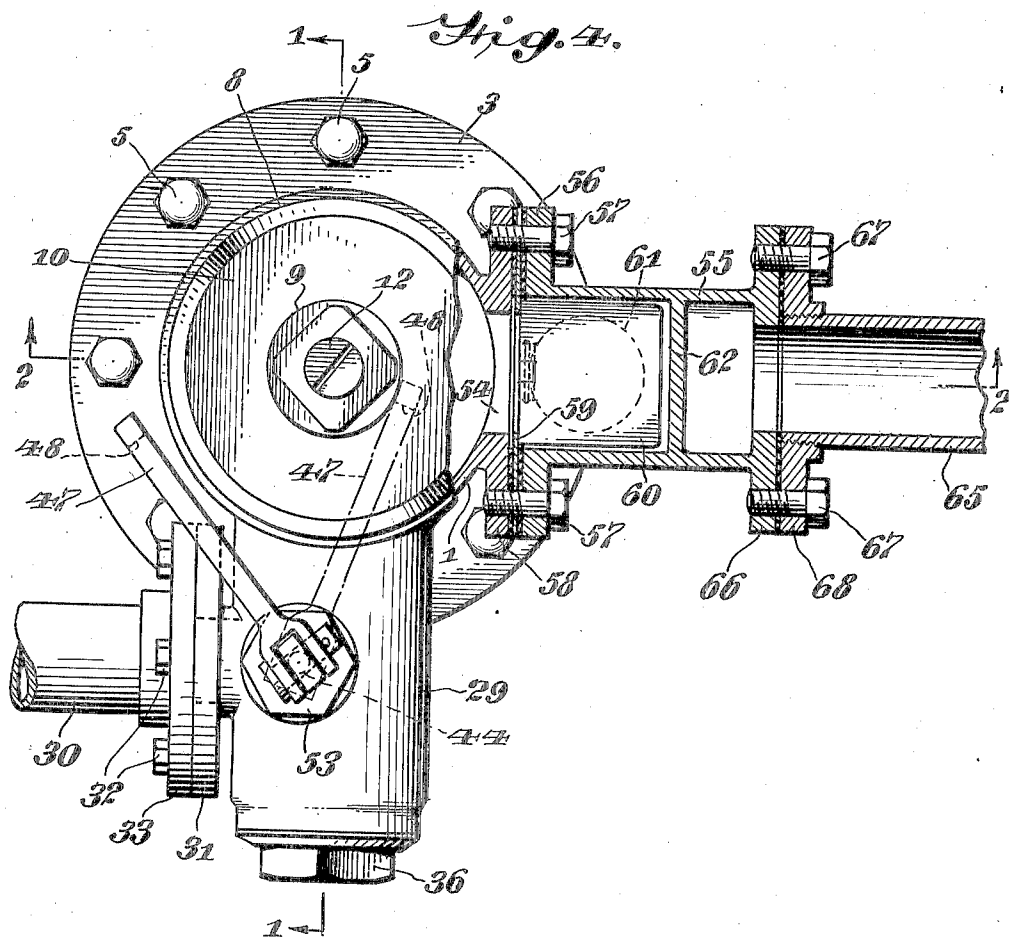
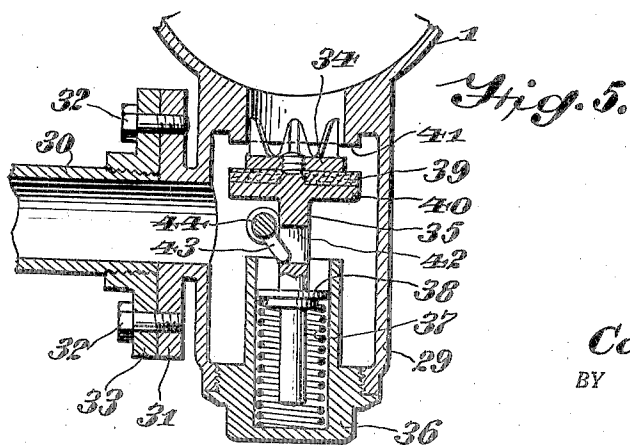
C. H. EHLERS

1,712,877

COMBINATION FILL, AIR VENT, AND RELIEF COUPLING

Filed Nov. 12, 1925

2 Sheets-Sheet 2



INVENTOR.
Carl H. Ehlers,
BY
Cornelius L. Ehler
ATTORNEY.

Patented May 14, 1929.

1,712,877

UNITED STATES PATENT OFFICE.

CARL H. EHLERS, OF PENFIELD, PENNSYLVANIA, ASSIGNOR TO THE ATLANTIC REFINING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

COMBINATION FILL, AIR VENT, AND RELIEF COUPLING.

Application filed November 12, 1925. Serial No. 68,601.

My invention relates to apparatus utilizable in combination with closure structure carried by a port, as the inlet port of a tank or receptacle for controlling the pressure of gaseous or liquid material from the tank, and for other purposes.

In accordance with my invention, suitable closure structure carried by the inlet port of a tank, as aforesaid, is so related to mechanism controlling the admission of a pressure applying medium to the tank that the closure structure may not be removed without first actuating the control mechanism to check admission of the pressure-applying medium.

Further in accordance with my invention, the gaseous pressure within a tank or receptacle is controlled by a device rendered operative upon increase in pressure above a predetermined value to discharge the gaseous medium to a suitable destination, as a chamber leading to the atmosphere, and more particularly, said chamber encloses mechanism permitting passage of a gaseous medium therethrough but preventing passage of a liquid along the path taken by said medium.

My invention resides in apparatus of the character hereafter described and claimed.

For an illustration of one of the forms my apparatus may take, reference is to be had to the accompanying drawing in which:

Figure 1 is a vertical sectional view of apparatus constructed in accordance with my invention taken on line 1—1 of Fig. 4.

Figure 2 is a vertical sectional view taken on line 2—2 of Fig. 4.

Figure 3 is a vertical sectional view of a fill bushing.

Figure 4 is a plan view, partly in section, of apparatus constructed in accordance with my invention.

Figure 5 is a horizontal sectional view showing a control valve in open position.

Referring to Figs. 1 and 2, an elongated casing 1 is secured in any suitable manner to a pipe or conduit 2 opening into a suitable tank or receptacle (not shown). Preferably, casing 1 is provided with a flange 3 secured to a corresponding flange 4 of conduit 2 by bolts 5, or equivalent.

Casing 1 comprises an internally threaded collar 6 having a diameter somewhat less than the diameter of the casing, said collar

receiving a threaded pipe 7 spaced from the circumferential wall of casing 1 and conduit 2 and extending into the tank substantially in parallel relation with respect to conduit 2.

A closure cap 8 received by the open end of casing 1 comprises a stem 9, a disk 10, and a circular threaded sleeve 11, all formed, preferably, as one integral part. A detachable plug 12 threaded into an opening in the stem 9 may be removed to permit insertion of a suitable tool for a purpose hereinafter described. A washer 13, of suitable material, as a composition of asbestos and suitable binding material, is carried by a valve disk 14 formed integrally with a sleeve 15, provided with a series of perforations 16. Sleeve 15 extends into stem 9 and is provided with a circumferential groove 17 receiving one or more screws 17^a, or similar retaining devices. Sleeve 15 is threaded at one end to receive a cap 18 having a longitudinally extending passage receiving the shank 19 of a valve disk 20 biased by a coil spring 21, or equivalent, into engagement with the wall of an opening 22 in the valve disk 14. Obviously, the compression of spring 21 and the force necessary to move disk 20 from its seat may be varied by adjusting cap 18 longitudinally of sleeve 15.

Upon removal of cap 12 from stem 9, as described above, a suitable tool may be inserted interiorly of said stem into engagement with shank 19 of valve disk 20. Thereupon, by rotating said tool, valve disk 20 is rendered effective to grind its seat.

Casing 1 is provided with an annular flange 23 forming a seat for the washer 13 associated with valve disk 14 and also for a flange comprised in the end of a fill bushing hereinafter described.

Closure cap 8 may be removed from casing 1 and a fill bushing 24, Fig. 3, substituted therefor. Bushing 24 comprises an internally threaded collar 25 adapted to receive a fitting carried by the hose or other conduit passing the desired liquid into the tank. A threaded sleeve 26, corresponding in diameter with sleeve 11 of closure 8, is received by the threaded end of casing 1. A spout 27, preferably formed integrally with sleeve 26, terminates in a flange 28 adapted to rest upon the collar 6.

Referring to Fig. 1, a hollow angular ex-

tension 29, preferably formed integrally with casing 1 is secured to a conduit 30, Fig. 4, in any suitable manner, preferably, however, by a flange 31 formed integrally with said extension, and fastened by bolts 32 to a corresponding flange 33 formed integrally with conduit 30.

A guide member 34 freely slidable in the passage between hollow extension 29 and the interior of casing 1 is suitably connected to a rod 35 extending into a recessed cap 36 fitted in the end of extension 29. A coil spring 37, or equivalent, confined around rod 35 between cap 36 and a collar 38 secured to said rod biases the latter toward the right (Fig. 1) and holds a disk 39 of suitable material, as a composition of asbestos and a binding agent, confined between guide member 34 and a disk 40 forming a part of said rod in engagement with a valve seat 41.

A slot 42 in rod 35 receives a cam lever 43 carried by a shaft 44 one end of which is mounted in a bearing 45 comprised in extension 29. A collar 46 fitted into an opening in the wall of extension 29 in alignment with bearing 45 receives shaft 44 which is extended into a region lying in substantially the same plane as the top of cap 8. A lever 47 pivoted to the end of shaft 44 has a hook 48 which, at times, may be held in engagement with cap 8, as hereinafter described. Shaft 44 may be secured against axial movement with respect to extension 29 in any desired manner, preferably, however, by utilizing a collar 49 secured to said shaft and engaging the inner surface of collar 46.

To prevent leakage from within extension 29, suitable packing material 50 may be placed interiorly of a threaded extension 51 of collar 46 and compressed by a gland 52 controlled by a follower nut 53.

Referring to Figs. 2 and 4, the casing 1 is shown as provided with an aperture 54 opening into a float box 55 secured to casing 1 in any suitable manner, preferably, however, by a flange 56 formed integrally with said float box which is fastened by bolts 57 to a corresponding flange 58 on casing 1. A plate 59 retained between flanges 56 and 58 has an opening in alignment with aperture 54. A flapper plate 60 constructed preferably of aluminum is pivotally mounted on plate 59 and rests upon a spherical member 61, of cork, or so constructed as to be readily displaceable by the liquid stored within the tank. A wall 62 perforated as indicated at 62^a divides float box 55 into two chambers and is provided with a threaded recess receiving a collar 63 serving as a support for a second pivoted flapper plate 64. A conduit 65 leading preferably to the atmosphere is connected to float box 55 in any suitable manner, preferably, however, by a flange 66 formed integrally with said float box which is secured by bolts

67 to a corresponding flange 68 carried by conduit 65.

Apparatus of the character herein described is designed especially for use with a tank or receptacle containing gasoline under air pressure utilized to force the liquid from a discharge port.

To fill the tank, fill bushing 24 is substituted for closure cap 8 and the liquid, as gasoline, is passed through said fill bushing and pipe 7 into the tank. Meanwhile, air displaced by the liquid rises exteriorly of pipe 7 and passes through aperture 54 into float box 55 and thence along conduit 65. During passage of air in this manner, the relatively light flapper plate 60 prevents generation of air currents and holds spherical member 61 in the full line position shown in Fig. 2. If a plate of this character is not utilized, spherical member 61 will usually be impelled by the air currents in float box 55 into the passage through collar 63 thereby closing this passage end preventing escape of the displaced air.

A tank of the character herein described is usually filled by attaching a hose to the fill bushing and permitting the liquid to flow into the tank under the influence of gravity. Under such conditions, it may happen that the attendant will fail to observe when the tank is full and, accordingly, the overflowing liquid upon entering float box 55 along the same path taken by the displaced air, as described above, will move spherical member 61 into the passage through collar 63 and restrain passage of but a negligible quantity of liquid through conduit 65. In an action of this character, flapper plate 60 is ineffective to hold spherical member 61 in the full line position shown in Fig. 2. It will be observed that when the overflowing stream has been cut off, perforation 62^a serves to drain the chamber containing spherical member 61 and thereby permit said member to resume its normal position at the bottom of said chamber.

When the tank has been filled to the desired extent, fill bushing 24 is removed and closure cap 8 placed in position. As said cap is threaded into casing 1, washer 13 carried by disk 14 finally engages flange 23 whereupon, due to the presence of groove 17 and screws 17^a, rotation of disk 14 ceases, despite continued rotation of cap 8. As a result, washer 13 is compressed in an axial direction only. It is to be noted that during this operation, the strain is taken not by the screws 17^a but by the flange 9^a of stem 9 which engages the top surface of sleeve 15.

After closure cap 8 has been properly seated, arm 47 is moved from the full-line position to the dotted line position of Fig. 4. In so doing, said arm is swung vertically on its pivot, passed over the top of cap 8 and then

dropped on the far side thereof. Movement of arm 47 in this manner effects partial rotation of shaft 44 and movement of cam 43 toward the left (Fig. 1), or into the position shown in Fig. 5, whereby disk 39 is moved from its seat 41, against the expansive tendency of spring 37. Accordingly, if hook 48 of arm 47 is not dropped behind the cap 8 as indicated by the dotted lines in Fig. 4, spring 37 will expand and move disk 39 into engagement with its seat 41 and lever 47 will be swung back into the position shown in full lines in Fig. 4.

Pipe 30 leads to a device supplying a gas under pressure, as the discharge outlet of an air compressor. Accordingly, when disk 39 is moved from its seat, as aforesaid, air under pressure is supplied to the interior of casing 1 and to the surface of the liquid to effect discharge thereof.

It is to be noted that closure cap 8 may not be removed from casing 1 until after hook 48 has been raised and arm 47 permitted to swing to the full line position of Fig. 4, this action, as stated above, positioning disk 39 on its seat 41 and cutting off the supply of air to casing 1. Further, it is to be noted that it is necessary to retract cap 8 but a small amount to disengage disk 14 from its seat and that continued retraction of said cap widens the gap between said disk and its seat. As a result, prior to the time that cap 8 is entirely free from casing 1, the air pressure in the tank and said casing has been very materially reduced due to the escape of air between disk 14 and its seat and thence to and through float box 55. It follows, therefore, that closure cap 8 may be readily removed without damage to the operator manipulating the same, such as might occur if the full force of the air pressure in casing 1 was free to impel the closure cap just after removal from said casing. Further, passage of gasoline saturated vapors from the top of casing 1 is likewise prevented, any vapors of this character having passed into float box 55 before cap 8 is entirely disengaged from said casing.

By adjusting cap 18 axially of sleeve 15, the expansive tendency of spring 21 may be so regulated that valve disk 20 will move from its seat when the pressure in casing 1 exceeds a predetermined value, and when this occurs, air escapes through openings 16 and aperture 54 into float box 55, thence through conduit 65.

Flapper plate 64 swings freely to the dotted line position of Fig. 2 to permit passage of air or liquid toward the vent tank but acts as a check valve and closes the passage through collar 63, if for any reason, material should attempt to pass in a reverse direction.

What I claim is:

1. In combination, closure structure for the port of a tank, a conduit applying a gas under pressure to the liquid in said tank, a valve in-

terposed in said conduit, and structure intervening between said closure structure and valve to hold the latter in open position.

2. In combination, closure structure for the port of a tank, a conduit applying a gas under pressure to the liquid in said tank, a valve interposed in said conduit, and an arm controlling said valve adapted to engage said closure structure to hold the valve in open position.

3. In combination, closure structure for the port of a tank, a conduit applying a gas under pressure to the liquid in said tank, a valve biased to position closing said conduit, and structure connected to said valve adapted to engage said closure structure to hold the valve in open position.

4. In combination, closure structure for the port of a tank, a conduit applying a gas under pressure to the liquid in said tank, a valve biased to position closing said conduit, and structure connected to said valve adapted to engage said closure structure to hold the valve in open position and freely movable from engagement therewith to permit said valve to resume position closing said conduit.

5. In combination, closure structure for the port of a tank, a conduit applying a gas under pressure to the liquid in said tank, a valve biased to position closing said conduit, a shaft controlling said valve extending adjacent said closure structure, and an arm connected to said shaft engaging said closure structure to hold the valve in open position.

6. In combination, closure structure for the port of a tank, a conduit applying gas under pressure to the liquid in said tank, a valve biased to position closing said conduit, a shaft controlling said valve extending adjacent said closure structure, and an arm pivoted to said shaft engaging said closure structure to hold the valve in open position.

7. Apparatus of the character described comprising a port communicating with a tank containing a liquid under gaseous pressure, and closure cap structure closing said port in two regions and movable to first open in the region nearer the tank and then in the other region.

8. Apparatus of the character described comprising a port communicating with a tank containing a liquid under gaseous pressure, a closure cap closing said port in one region, and a second closure cap rotatably carried by said first-mentioned cap closing said port in a region nearer the tank, said closure caps movable to first open in the region nearer the tank and then in the other region.

9. Apparatus of the character described comprising a port communicating with a tank containing a liquid under gaseous pressure, a closure cap threaded to said port in one region, and a second closure cap rotatably carried by said first-mentioned cap closing said port in a region nearer the tank, said closure caps movable to first open in the

region nearer the tank and then in the other region.

10. Apparatus of the character described comprising a port communicating with a tank containing a liquid under gaseous pressure, closure cap structure closing said port in two regions and movable to first open in the region nearer the tank and then in the other region, a conduit communicating with said port between said regions, and relief valve structure operable upon rise in gaseous pressure within the tank above a predetermined value to open a path between said tank and conduit.
11. Apparatus of the character described comprising a port communicating with a tank adapted to contain a liquid, a conduit, a float box communicating with said port and conduit, a member readily displaceable by liquid in said float box, and a vane of relatively light material resting upon said member.
12. Apparatus of the character described comprising a port communicating with a tank adapted to contain a liquid, a conduit, a float box communicating with said port and conduit, a member readily displaceable by liquid in said float box, a vane of relatively light material resting upon said member, and means other than said conduit for draining liquid from said float box.
13. Apparatus of the character described comprising a port communicating with a tank adapted to contain a liquid, a conduit, float box communicating with said port and conduit, a spherical ball readily displaceable by liquid in said float box, a vane of relatively light material resting upon said ball, means other than said conduit for draining liquid from said float box, and a check valve preventing passage of fluid material in reverse direction from said conduit toward said port.
14. Apparatus of the character described comprising a conduit opening into a tank, a float box communicating with said conduit, means in said float box preventing passage of liquid material therethrough but ineffective to prevent passage of gaseous material, in one direction, and means for preventing the passage of fluid material through said box in a reverse direction.
15. Apparatus of the character described comprising a conduit opening into a tank, a float box communicating with the conduit, a float therein and a vane controlling the position of said float to prevent passage of liquid through said box but permitting passage of gaseous material therethrough.
16. Apparatus of the character described comprising a port communicating with a tank, a conduit, a float box communicating with said port and conduit, a float displaceable upon rise of liquid therein to close the passage to said conduit, and means normally preventing displacement of said float during passage of gaseous material to prevent generation of gas currents in said box.

CARL H. EHLERS.