Sept. 29, 1925. 1,555,265

A. B. CARLL

TANK CAR VALVE

Filed March 27, 1920 2 Sheets-Sheet 1

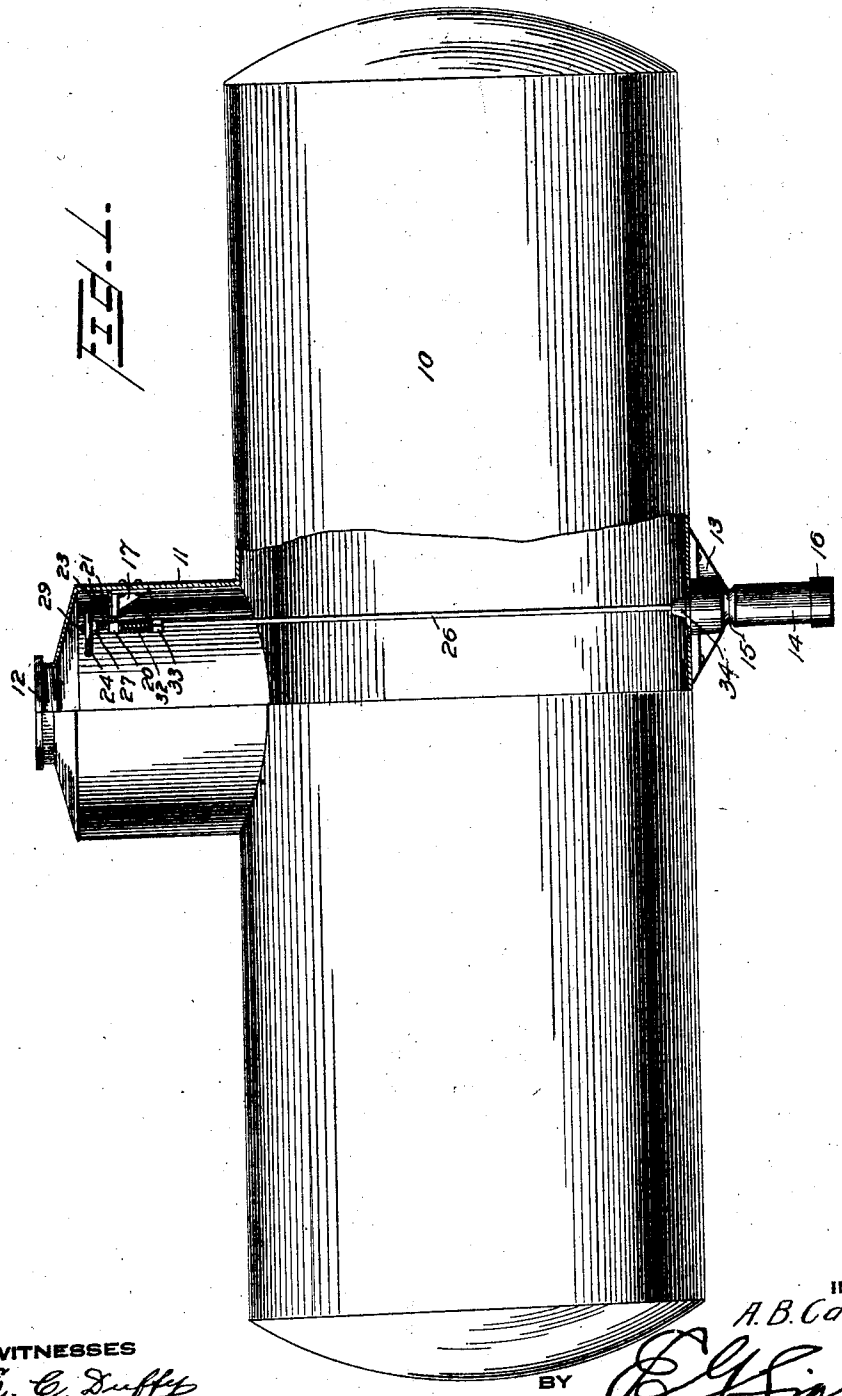


FIG. 1.

INVENTOR
A. B. Carll

WITNESSES
E. C. Duffy
Philip E. Siggers

BY E. G. Siggers

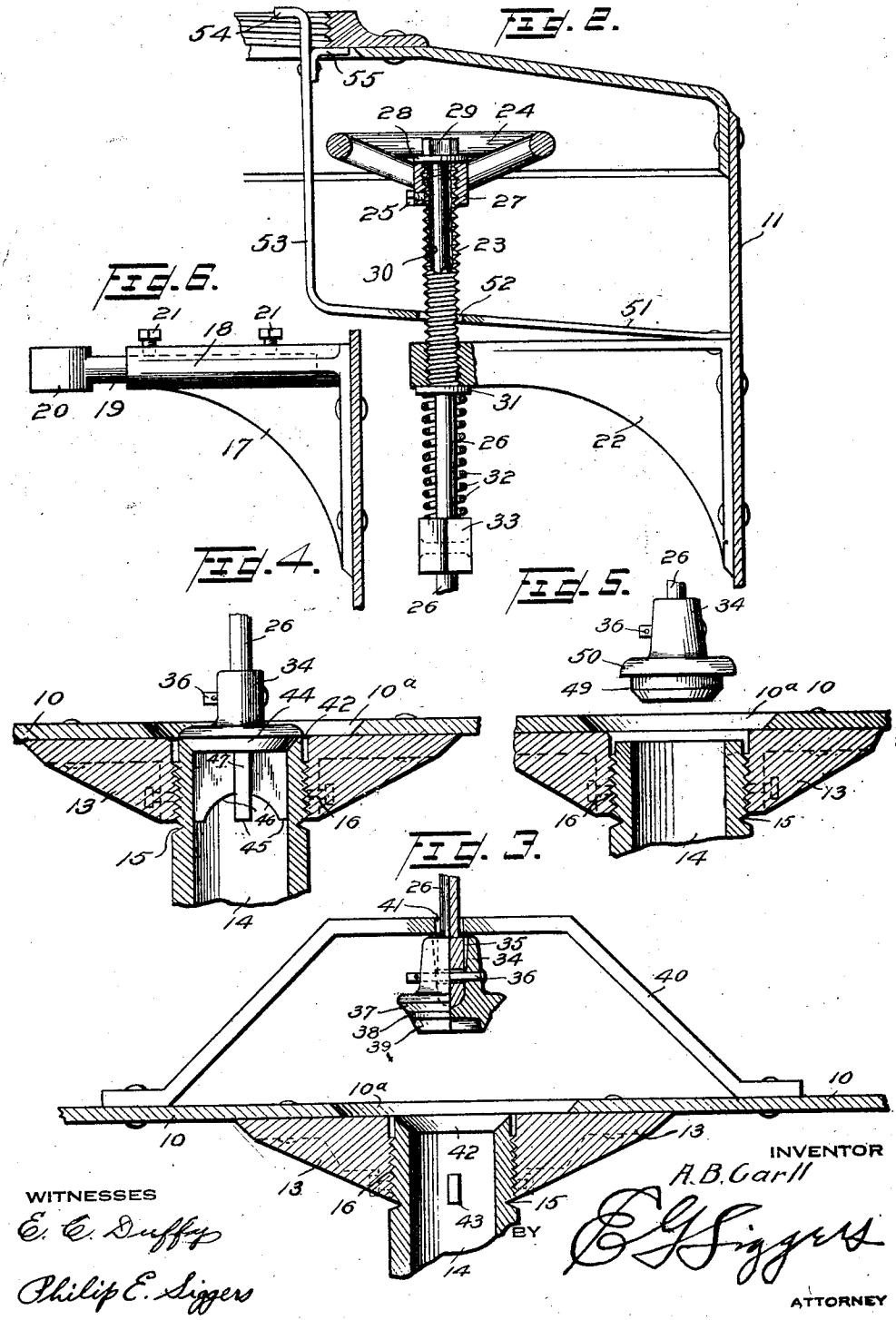
ATTORNEY

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WITNESSES

E. C. Duffy

Philip E. Siggers

INVENTOR

A. B. Carll

BY E. E. Siggers

ATTORNEY

Patented Sept. 29, 1925. 1,555,265

UNITED STATES PATENT OFFICE.

ADDISON B. CARLL, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO JOHN M. MILLIKEN, OF PITTSBURGH, PENNSYLVANIA; GUARANTY TRUST COMPANY OF NEW YORK, OF NEW YORK, N. Y., EXECUTOR OF THE WILL OF SAID ADDISON B. CARLL, DECEASED.

TANK-CAR VALVE.

Application filed March 27, 1920. Serial No. 369,354.

To all whom it may concern:

Be it known that I, ADDISON B. CARLL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Tank-Car Valve, of which the following is a specification.

This invention relates to the discharge valves and bottom outlets of tank cars and means for operating same.

The principal objects are to provide a valve and valve seat complete in themselves and which can be fitted and ground tight before being installed in the car, and easily removed afterwards when necessary, and in which the valve is always seated in true and exact place by means within the seat, and also to provide an operating device so the valve may be opened gradually or part way.

A further object of the invention is to provide means for preventing the dome cover from being closed until the bottom valve is completely closed.

It is necessary to have a spring cushion between the valve and the device for operating it when this device is in the dome, owing to the change of shape of the tank when empty and loaded, and also to the vibration in transit.

Previously these valves have been operated by a rod extending into the dome, this rod being forced down by a spring, the only means of raising it being by a cam or lever. With such an arrangement the valve cannot be opened gradually or left partly opened, as is often desirable.

The hollow shaft here shown provides means for operating these valves in any manner required, such as drawing small samples from the bottom of the car, or for drawing off water which might have settled there. The spring under the shaft insures a constant pressure of the valve upon its seat, regardless of expansion of the valve rod or changes in the shape of the tank. Should the bottom leg become full of water and freeze, this spring permits the valve to raise, thus relieving the expansion and preventing the bottom leg from being bursted.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing in the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Fig. 1 is an elevation with parts in cross section of the tank of a car showing one embodiment of the invention in position.

Fig. 2 is a detailed cross section showing the means for operating the valve associated with means for preventing the dome cover from being put on until the valve is completely closed.

Figs. 3, 4 and 5 are each detail views partly in cross section of different forms of this valve, and adapted to be used with the valve-operating construction shown in Fig. 2.

Fig. 6 is an elevation of an adjustable bracket for the valve rod.

Referring to Fig. 1, the numeral 10 indicates the tank proper of a car having a dome 11, and a dome cover 12.

At the bottom of the tank an outlet flange 13 is provided, to which the outlet leg 14 is screwed. This outlet flange is so shaped that it cannot be damaged in case the outlet leg is broken off, and so it will slide over obstructions in case the tank shears from the underframe in a wreck. The usual V-shaped groove 15 is provided on the circumference of the outlet leg 14, close to the flange, so this leg may be broken off without damaging the flange or the part of the leg remaining in it containing the valve seat. A cap 16, of the usual form, is screwed onto the lower end of the outlet leg when the cars are in transit. (Fig. 1.)

Referring to Fig. 3, the outlet flange 13 is riveted to the bottom of the tank, and the outlet leg 14 is screwed into it. The lugs 43, projecting from the inner walls of the outlet chamber in a radial direction, provide convenient means by which this end may be unscrewed should the lower end be broken off. The upper end of the outlet leg is shown as being on a level with the inner face of the flange 13. A valve

seat 42 is formed upon the upper end of this leg and the inner walls of it are made true with the valve seat. This valve seat may be made either beveled, as shown in Figs. 3 and 4, or flat as shown in Fig. 5. Referring to Fig. 3, the valve comprises a beveled seating shoulder 37, a short cylindrical centering portion 38, and a tapered entering portion 39. The valve and valve seat are preferably beveled at an angle of forty-five degrees, while the taper of the entering portion is preferably sixty degrees. It will thus be seen that the tapered entering portion will only come in contact with the inner lower edge of the valve seat. This valve has a collar 34 on its upper side with a socket 35 in which the valve rod 26 is loosely pinned. This socket tapers towards its lower end to permit the valve to rock to a limited extent with respect to the rod. This swing or rocking of the valve is provided so the valve may always seat freely regardless of the rod being perfectly in line with the valve seat. A pin 36 passing through the collar 34 and through an aperture in the lower end of the rod 26 provides for holding the valve upon this rod. A guiding bracket 40 riveted to the bottom of the tank, provided with a hole or bore 41 considerably larger than the valve rod, guides this rod so the tapered lower part of the valve will always enter the valve seat. When the valve is seated, however, this bracket should not touch the valve rod.

The valve shown in Fig. 5 is the same as that shown in Fig. 3, except that a flat seat is used instead of a beveled one. This valve requires the guiding bracket 40 shown in Fig. 3.

The valve in Fig. 4 differs from that of Fig. 3 only in eliminating the guiding bracket, and in substituting a guiding web in place of the centering shoulders 38 and the beveled portion 39 of the previously described valves. Here the valve 44 consists of a plain disc with a beveled face and carries at its lower end a guiding web in the form of a plurality of radially extending members. These members meet centrally to form a cross, have each a curved cutaway section 46, and have their outer longitudinal edges properly curved to fit the interior walls of the discharge leg 14. As these webs are not pulled entirely out of the leg when the valve is opened, the guiding bracket inside the tank is not needed.

I consider the present invention independent of any particular form of valve seat or shape of the guiding device under the valve. The essential features are that the valve when fitted to its seat shall always afterwards be guided to the same central position by means projecting from the lower face of it into the seat opening, and that both seat and valve may be taken out and renewed; further, by unscrewing the top nut 29 on the valve stem (described later), the valve and rod may be lowered through the opening in the outlet flange after the leg 14 has been taken out and the new valve installed without getting into the tank.

Fig. 2 shows the operating device for this valve, or a valve of any other kind, and also a device for preventing the screwing on of the dome cover before the valve is closed. This latter device is desirable, as sometimes after the car is emptied it is returned with the valve open, contrary to instructions issued by the railroad.

The valve rod 26 extends diametrically of the tank, as indicated in Fig. 1, from the valve to the dome. A bracket 22, riveted to the side of the dome, has an internally threaded outer end. An externally threaded hollow shaft or sleeve 23, carrying a hand wheel 24 at its upper end, functions in the externally threaded outer end of the bracket 22, which threaded outer end serves as a nut. The valve rod 26 passes through this threaded shaft 23 and is held by a nut 29 and washer 28 at its upper end. A strong compression spring 32 encircles the valve rod 26 and bears at its lower end against the collar 33 made fast to the valve rod, and at its upper end bears against the externally threaded hollow shaft 23, a washer 31 being provided between the spring and the hollow shaft.

It will be seen that when the hollow externally threaded shaft is screwed up or down, the valve rod and valve will be carried with it, and that when the valve is seated and the screw still further operated downwardly, the spring 32 will be further compressed. The screw 23 is of such a length that when the valve is raised to its proper height, the washer 31 comes in contact with the lower side of the external end of the bracket 22, and when the valve is seated the screw may be still further operated downwardly to give the spring sufficient compression to allow for any change in the shape of the tank. When the hub 27 of the hand wheel is screwed entirely down, it will be locked upon the upper side of the bracket 22. The collar 33, fast to the valve rod 26, is preferably made square or hexagonal in cross section so that a wrench may be used upon it if necessary to turn or rotate the valve, should it need regrinding. The hand wheel 24 is preferably threaded internally to receive the end of the threaded screw and is held in place by a set screw 25.

In Fig. 6 is shown a form of adjustable bracket, desirable when this appliance is being installed in tanks which are not uniform in size, and which would require brackets of

different lengths. This bracket comprises a web 17, a head 18 having a bore therein to receive the rod 19, and set screw 21 engaging said rod to hold it in adjusted position. The rod 19 has a collar 20 at its outer end, which collar is threaded serving as a nut to receive the screw 23 already described. It will be seen that with this adjustable bracket the screw collar 20 can always be adjusted so the valve rod will hang centrally over the valve seat. This bracket can be used with a dome cover device to be described later, by locating the set screw 21 on the under side and making the hole 52 in the spring oblong.

Means for preventing the dome cover from being screwed in place until the valve is closed is provided, as shown in Fig. 2. Here a strong flat metallic spring 51 is secured at one end to any convenient point such as the bracket 22, or it may be secured directly to the dome. This spring has an upturned bent section 53, which section is in turn bent at right angles as at 54 and carries a projection 55 short of the free end 54. This projection is designed to engage with the under side of the rim which receives the dome cover and to prevent the spring from projecting up too high, for when cars are being unloaded and the valve has to be opened, the dome cover should be laid over the opening. This spring should be strong enough to support the weight of the dome cover, as well as any force used in screwing it on, so that it cannot be screwed on by mistake before the valve is closed. When, however, the hand wheel 24 has been screwed down to the point where the valve rests upon the seat, the hub of this wheel 24 will engage the spring 51, and when this wheel is finally screwed down the full way, the top of the spring will be drawn down below the dome cover opening. The spring 51 has an elongated opening in it through which the screw threaded section of the valve rod passes.

What is claimed is:

1. In a tank car valve, the combination of a valve for closing an opening in the bottom of the tank, a valve rod extending from the valve into the dome of the tank car, a threaded hollow shaft mounted upon the upper end of said rod, a fixed nut mounted in the dome and coacting with said shaft, a spiral spring bearing against the lower end of said shaft, and means fixed to the rod forming a stop for the spring and also for turning the rod.

2. In means for closing the bottom outlet of tank cars, the combination of a valve, a valve rod, and a flat spring having an elongated opening through which said valve rod operates, said spring being so shaped that its upper end will project into the dome cover opening when the valve operating device is open, and when the valve operating device has closed the valve, said upper end of said spring will be drawn down below the dome cover opening, thus permitting the dome cover to be screwed on.

3. In a tank car valve, the combination of a valve for closing an opening in the bottom of the tank, a valve rod extending from the valve into the dome of the tank car, a threaded hollow shaft mounted upon the upper end of said rod, a nut stationary in the dome and coacting with said shaft, a spiral spring bearing upon the lower end of the shaft, means fixed to the rod below the spring for holding it from moving downwardly and also for turning the rod, whereby the valve may be brought upon its seat by the action of its threaded shaft and spring to any desired pressure and may then be turned by the operation of the said fixed means on the rod and reground to a perfect fit in case of leakage.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

ADDISON B. CARLL.