

Oct. 8, 1929.

S. E. TURNER

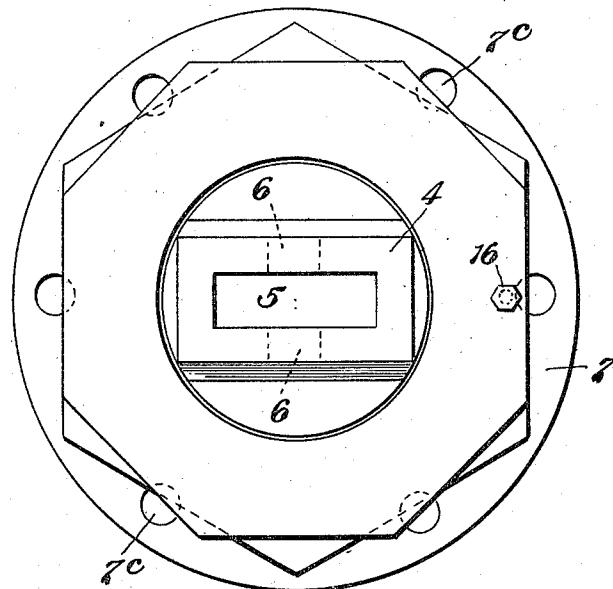
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OUTLET VALVE FOR TANK CARS

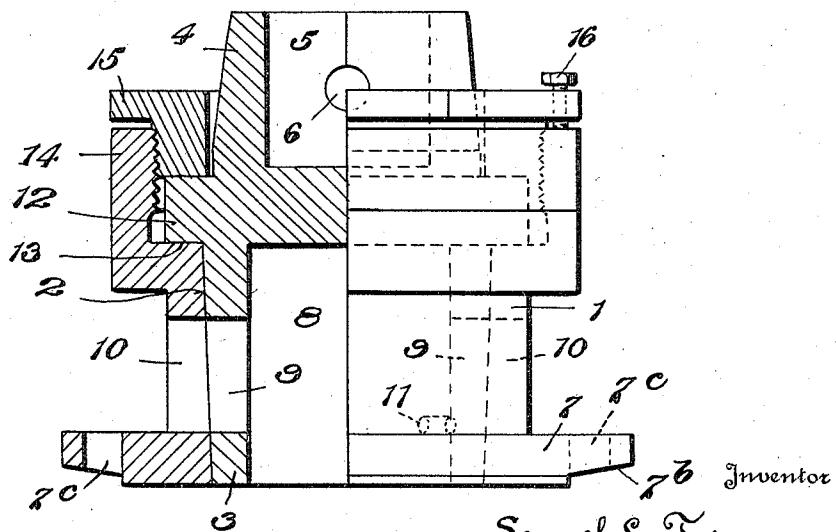
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2 Sheets-Sheet 1

*Fig. 2.*



*Fig. 1.*



Samuel E. Turner

By

*Edward E. Church*

Attorney

Oct. 8, 1929.

S. E. TURNER

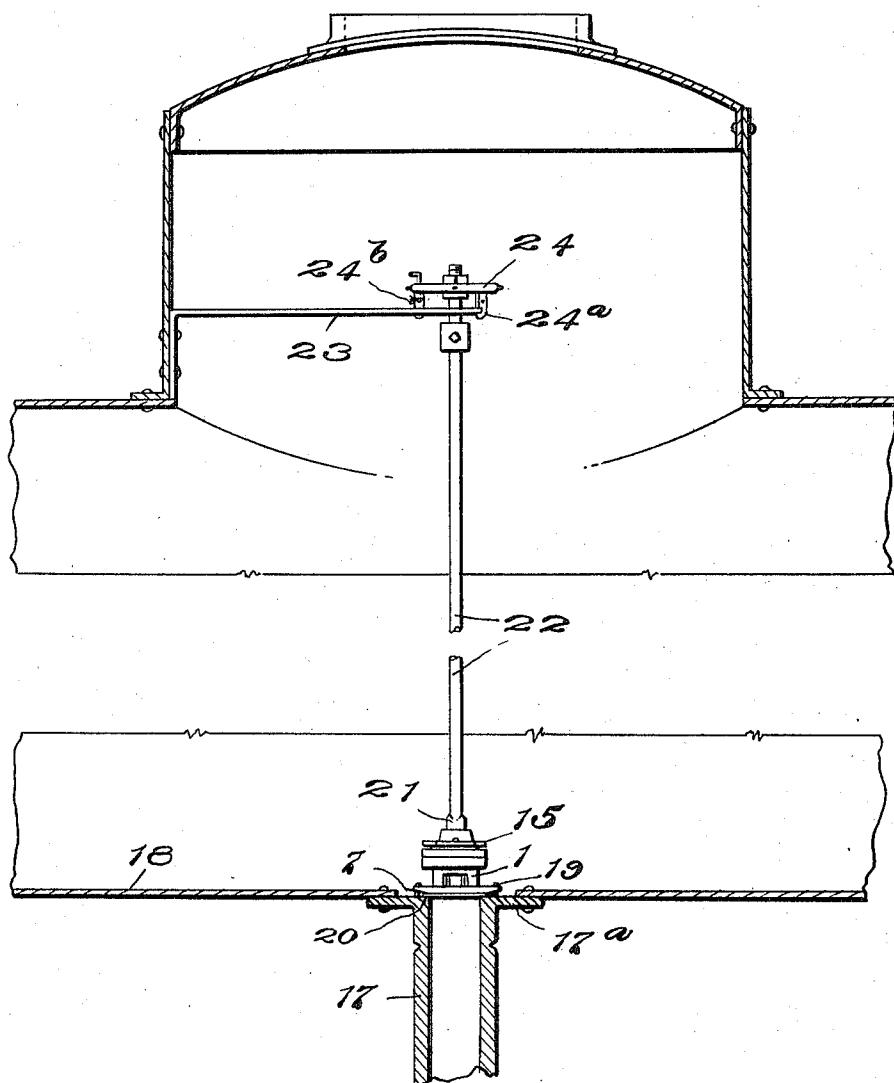
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2 Sheets-Sheet 2

Fig. 3.



Invent.  
Samuel E. Turner

By Edward E. Clement

Attorney

## UNITED STATES PATENT OFFICE

SAMUEL E. TURNER, OF WICHITA FALLS, TEXAS

## OUTLET VALVE FOR TANK CARS

Application filed August 22, 1927. Serial No. 214,610.

My invention relates to tank cars and particularly to outlet valves therefor. It is in the nature of an improvement over the invention set forth in my prior application filed 5 January 16, 1926, Serial No. 81,799. In that application I disclosed a valve for tank cars having a discharge pipe or outlet leg riveted to the lower main tank sheet of tank by a flange, a valve cage screwed into the upper 10 end of the discharge pipe, a valve within the cage having lateral discharge and drainage ports, and an operating rod extending upwardly from said valve into the dome of the car at the top of the tank, where it is received 15 and held in a journal bracket, to prevent upward movement or unseating of the valve.

In the present case salient objects of my invention are to provide a valve simple in design, that will not be affected by acids commonly found in tank cars, by corrosion, by 20 vibration, by freezing, by contraction or expansion, or by rust accumulation in car; that does not project below the outlet stem flange; that is held in place positively and without 25 springs; that will not be disturbed or unseated by the surging or washing from one end to the other of the contents of the car; that is readily accessible for grinding or repairs; that will not tighten under vibratory 30 action of the valve rod; that cannot be operated from the outlet stem, thereby preventing theft of the contents of the car; that will operate readily and easily; that will not become unseated when outlet stem is filled with 35 ice; that has sufficient outlet capacity; that will hold contents of car from all leakage; that is easy to install in any tank car; that when closed and sealed will not jar itself open; that can be opened or closed with a one-quarter turn of valve rod; that will allow 40 for the drawing off of water only; and finally, that is fool-proof.

I attain my objects in the following manner: I simplify the structure of my valve by 45 providing positive means to hold the valve to its seat thereby doing away with the stop collar, and also making it impossible to jar the valve loose. Instead of the threaded connection between the valve cage and the outlet 50 let stem, described in my prior application,

I provide a flange on the valve cage which is faced off to set accurately on the top of the outlet stem flange to which it is screwed. I secure the valve casing to the flange of the outlet leg which flange in turn is secured to the tank sheet, and the valve casing lies entirely above the said outlet flange with all its parts. Thus no fitting is required in the bore of the outlet leg and particularly no springs or other devices are necessary therein. 55 My valve is slightly tapered, being ground or otherwise reduced to an exact fit and is held down by means of a clamping ring secured into the valve casing and working against a body flange on the valve. This 60 clamping ring is locked in position when adjusted so that the valve cannot be jarred open and will not leak due to vibration in transit, cannot be forced or juggled open for the 65 theft of the car contents and will not jam or become frozen under any circumstances. The core and the casing are both made with 70 heavy thick walls, and have great mass, so that their natural period of vibration is very low, and renders them irresponsive to vibrations of the car body. They are also made 75 of incorrodible metal, such as Hills-McCanna alloy, which is relatively soft and requires protection against mechanical injury. For 80 this reason the bearing surfaces of the two parts not only fit closely throughout, but are protected by a lateral overlying flange to be presently described, which excludes foreign 85 matters such as grit and the like. The valve core and the casing is provided with lateral 90 ports which can be opened fully by a quarter-turn of the operating rod, and the core is also provided with a drainage port or ports for drawing off water. The upper end of the operating rod carries a castwheel with stops 95 that impinge against the bearing bracket, so that in opening and closing as well as in the prevention of irregular operation, the valve and its rigging are practically fool-proof.

While particularly adapted to new cars, my present invention may also be adapted to old cars by the use of a portable valve grinding tool. A set between the flanges can thus be obtained without the removal of the outlet leg from the car.

My invention is illustrated in the accompanying drawings, in which

Fig. 1 is a side view, partly in vertical section of my valve and casing.

5 Fig. 2 is a plan view thereof.

Fig. 3 is a longitudinal sectional view of part of the tank car showing the general assemblage of outlet leg, valve, operating rod and bracket. In this figure the valve is also 10 partly in section and the outlet leg is shown in full section.

Referring to the drawings, 1 is the valve cage having a taper bore 2, forming a stationary valve seat to which is fitted by grinding or otherwise the taper valve core 3, carried on the movable body 4, provided with an elongated socket 5 to receive the end of the operating rod which is secured in position by means of a bolt extending through the 20 side openings 6. The valve cage 2 is flanged at 7 and this flange is faced off at 7<sup>a</sup> to form an accurate fit with the upper face of the flange on the outlet leg which will be presently referred to. The valve core 3 is a shell 25 containing within itself a cylindrical recess 8 with a pair of side openings or ports 9 adapted to be brought into and out of register with a pair of similar ports 10 in the valve cage 1. Close to the level of the ports 30 9 and 10 are drain openings or ports 11 in the core 3 spaced slightly to one side of each port 9 where they may be moved into communication with the ports 10 without permitting communication between ports 9 and 35 10. These drain ports are shown merely for completeness and will not be claimed herein as they have already been made the subject of claims in my prior application. The flange 7 is preferably circular in contour, 40 has an annular mitre or bevel 7<sup>b</sup> around its upper edge, through which are bored six equally distant  $1\frac{9}{16}$ " holes for the use of  $1\frac{1}{2}$ " x  $1\frac{3}{8}$ " cap screws. The flange 7 itself is preferably  $\frac{3}{4}$ " in thickness by  $1\frac{1}{4}$ " in 45 width as a part of the cage of the valve.

The valve body 4 carries a flange 12 which rests upon a shoulder 13 accurately faced off upon the valve cage 1. The valve cage carries a vertical flange 14 internally threaded, 50 into which screws a locking ring 15 bearing upon the flange 12 and when properly adjusted, held in position by a set screw or equivalent 16.

Referring now particularly to Fig. 3, the 55 outlet leg is shown at 17, its flange 17<sup>a</sup> being riveted to the tank sheet 18 and receiving on its upper face the flange 7 of the valve cage 1. The cap screws 19 referred to are inserted through the openings 7<sup>c</sup> of the flange 7 60 into corresponding threaded openings in the outlet leg flange 17<sup>a</sup>. The beveling of the flange 7 at 7<sup>b</sup> throughout  $1\frac{5}{16}$ " of its width on the under side allows a more perfect seat to be obtained by the engaging faces of the 65 flanges 7 and 17. A thin copper gasket in-

dicated at 20 may be used if desired between the valve and the outlet leg.

Fitting into the rectangular socket 5 is the foot 21 of the operating rod 22 the upper end of which is journaled in the bracket 23 above which it is provided with operating cast wheel 24, fixed on the rod and carrying downwardly extending lugs 24<sup>a</sup> which strike the valve rod supporting bracket 23 when the valve is in either of its extreme positions. In 75 one of these lugs 24<sup>a</sup> I provide a car seal opening 24<sup>b</sup> for passing seals through and around the supporting bracket 23 when the valve is closed.

This valve is built in two sizes, one to fit 80 the outlet leg most commonly used in tank cars, which has an inside diameter of  $3\frac{3}{4}$ "'. This valve is used on cars already in service and is built without removing the outlet valve from the car. The second size is one 85 of  $2\frac{1}{2}$ " greater diameter, in which the core has an inside diameter of  $3\frac{3}{4}$ "', with outlet ports  $2\frac{1}{2}$ " x  $2\frac{1}{2}$ "'. This gives an area of outlet ports of  $12\frac{1}{2}$  square inches which is 90 slightly more than the sectional area of the stem or leg. This second size of valve is used on new cars or on cars in which the outlet stem or leg is being renewed. In applying this larger size valve an outlet leg of the 95 design shown in Fig. 3 is usually employed, as otherwise the old leg must be removed, milled, threaded and replaced. In any case, it is important and in fact necessary to successful fitting of my improved valve, that a sufficient diameter of the surface of the top 100 of the outlet leg flange be milled to a plane. If a copper gasket is used as referred to, it will help to produce a tight joint, but I place my principal reliance upon accurate milling and fitting to a set and with such accurate 105 fitting, with or without the copper gasket, it is possible to make an air tight joint. This accurate fitting has been absent from valves heretofore in use, even where abutting faces have been used to make a joint, and as I believe the same to be original with me, and in view of the fact that it attains improved 110 results, I shall claim the same herein as of my invention, together with structural features of the valve and its method of operation.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A valve for tank cars comprising the following instrumentalities: a cylindrical valve cage having a flange extending around its lower end faced off to an exact plane to fit a similarly prepared surface on the top of the outlet leg of a car, means such as cap screws 120 for securing said flange to said outlet leg, a valve core fitted in said cage comprising a body adapted to receive an operating rod at its upper end, and having an integral shell 125 open at its lower end provided with lateral 130

ports registering with similar ports in the valve cage, together with a horizontal shoulder receiving a flange on said core, and means carried upon and extending around said shoulder bearing on said flange to hold the same and the valve shell immovably seated under all conditions subject to rotary movement only, all the parts of the core and the cage being made of such thickness and of such mass as to have a natural period of vibration below that of the tank sheets and the body of the car.

2. A valve for tank cars comprising the following instrumentalities: a cylindrical valve cage having a flange extending around its lower end faced off to an exact plane to fit a similarly prepared surface on the top of the outlet leg of a car, means such as cap screws for securing said flange to said outlet leg, a valve core fitted in said cage comprising a body adapted to receive an operating rod at its upper end, and having an integral shell open at its lower end provided with lateral ports registering with similar ports in the valve cage, together with a horizontal shoulder receiving a flange on said core, and a vertical extension on said shoulder threaded to receive a ring nut or locking ring adapted to bear down on the flange of the core, all the parts of the core and the cage being made of such thickness and of such mass as to have a natural period of vibration below that of the tank sheets and the body of the car.

3. In a tank car having an outlet leg secured to its bottom tank sheet, said leg being flanged on its upper end and its flange being faced off inside the outlet opening in the tank sheet to produce an accurate plane surface, a valve comprising a cage or casing having a cylindrical body, a horizontal flange in its lower end accurately faced off to fit the plane portion of the upper surface of the outlet leg, a horizontal internal shoulder in the upper part of said casing, with a vertical threaded flange surrounding same, and a valve core fitting within the cage or casing shaped at its upper end for connection to an operating rod, provided with a horizontal flange adapted to engage and rest upon the said shoulder in the casing, and a hollow shell on the core accurately fitting the interior of the casing when said flange and shoulder are engaged, said shell being provided with a downward opening and lateral ports registering with corresponding ports in the casing, and a ring nut in threaded engagement with the vertical flange of the casing and adjustable thereon to bear upon the upper side of the horizontal flange on the core, together with means for locking said ring nut in any adjusted position, and means such as cap screws for securing the bottom flange of the casing to the outlet leg, all of the parts of the core and the cage being made of such thickness and of such mass, as to have a natural period of vibration below

that of the tank sheets and the body of the car.

In testimony whereof I hereunto affix my signature.

SAMUEL E. TURNER.

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